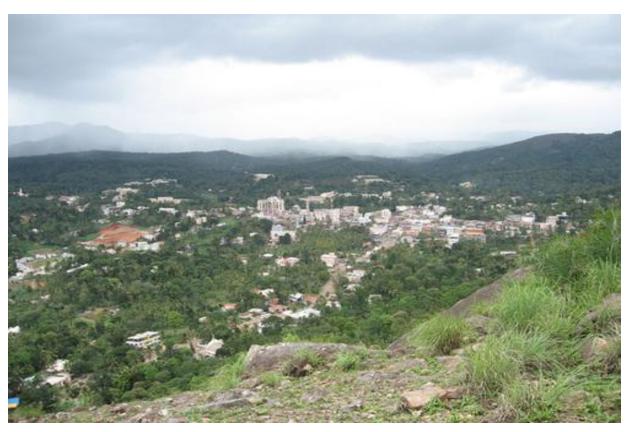
KERALA WATER AUTHORITY

SEWERAGE CIRCLE KOCHI



DETAILED ENGINEERING REPORT

COMPREHENSIVE SEWERAGE SCHEME FOR KATTAPANA MUNICIPALITY



Prepared by: Sewerage Circle, Kochi January 2022

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EXECUTIVE SUMMARY

Environment protection has become the most important aspect in the present era of sustainable development. With uncontrolled urbanization, contamination of drinking water sources by sewage and septage has become a major threat to public health and safety. Direct discharge of sewage to the water courses from un sewered areas and discharges of septic tank effluents to the stream and canals have been contaminated the entire water course.

Government of Kerala (GoK) has launched the "Rebuild Kerala Initiative (RKI)" for infrastructure development of Kerala. Providing Sewerage network in major cities and towns is given utmost importance considering the increasing pollution of water bodies due to lack of proper disposal of sewage. Also Honorable National Green Tribunal (NGT) has given directions to implement sewerage system for various cities of Kerala to control pollution of major water bodies.

The local bodies, constitutionally entrusted with the responsibility of environmental protection, have only limited infrastructure and expertise to tackle the situation. Hence Kerala Water Authority, being a state wide establishment with qualified and experienced personnel in Public Health Engineering, has been considered by the government to take up the responsibility. As per the Kerala Water Supply and Sewerage Act, 1986 KWA has the function of rendering services in collection and disposal of waste water. To meet the growing demand for waste water management, KWA established a Sewerage Vertical Wing, led by the Chief Engineer, PPD & WASCON. PPD Wing's three circle offices in Thiruvananthapuram, Kochi, and Kozhikode have been designated as Sewage Circle offices in addition to Kochi sewerage circle office. These wings are responsible for the investigation, planning, design, and DER preparation of sewerage projects.

As per the direction of KWA, a comprehensive sewerage plan had been developed in the year 2020 for Idukki district. As a pilot project, two local urban bodies (ULBs) of Idukki district has been selected for implementation of sewerage scheme and Kattapana Municipality is one of the ULBs selected for the preparation of sewerage scheme by Sewerage Circle Kochi-11.

This Detailed Engineering Report envisions the establishment of comprehensive sewerage scheme for Kattapana Municipality of Idukki district in Kerala State. The project proposes a well-planned sewerage pipe line network for the core area of Municipality , pumping stations, and sewerage treatment plant with suitable technology so as to ensure the quality of effluent as per KSPCB standards and also to provide septage management facility to the area where laying of sewerage network is not feasible. Furthermore, septage treatment is proposed in core areas where the houses/building in the low lying areas which are not possible to connect to the sewage network system. The undulated terrain and scattered population is a

bottle neck in the sewerage scheme planning.

The scheme area is divided into two separate zones of sewage network and septage and is designed to meet the sewerage demand up to the year 2053, using 2023 as the base year and a design period of 30 years. The zoning is based on topography, population density, altitude and other factors. Sewerage network system is planned in the core area of municipality with a coverage of 5 sq.km and septage zone is proposed in balance areas where the population is scattered and terrain is highly undulated. Furthermore, septage treatment is proposed in the core city areas where there are no road network or in low lying areas. The ultimate sewage load for the Sewage scheme is 1.76 MLD including non-domestic demand and infiltration. The scheme covers 52.77 km2 area of kattapana Municipality with the design population of 58167. Co- Treatment is proposed along with the Sewage Treatment Plant covering entire septage zones of Municipality. This proposal includes 1.76 MLD STP with MBBR technology at Housing board plot near bypass road in Kattapana Municipality with a sewer network of 27.406 km, 1100 manholes, five collection wells and pumping stations and 24 lifting stations. Manholes at 30 m intervals and at all intersections are proposed to facilitate maintenance operations.

Total Estimated cost of the project including 10-year O&M cost is 113.50 corers.

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ISTANT EXECUTIVE ENGINEER-SEWERAGE CIRCLE

CHI-11

Superintending Engineer Kerala Water Authority Sewerage Circle Kochi - 11

Executive Engineer Sewerage Circle Kochi - 11

PROJECT AT A GLANCE

| Project Details | Detailed Engine scheme in Ka sewerage networ FSSM in balar STP of capacity 1.7 | attapana Municipality covering 5km rk system in the city area and nce area of Municipality with one |
|---|--|---|
| | | |
| LSGI Covered under the scheme | Kattapa | ana Municipality |
| Total Scheme Area | 52.77 | Sq.km |
| Total Population (Year 2011) | 42646 | Nos |
| Total Population (Year 2023) | 46601 | Nos |
| Population Density | 808 | No./Sq.km |
| Design Period | 30 | years |
| Expected Population (Year 2053) | 58167 | Nos |
| Number of Zones | 2 | Nos. (Zone 1-Sewerage network, Zone 2- Septage) |
| Number of Collection Wells | 5 | Nos |
| Sewerage Network area | 5.084 | Sq.km |
| Population in Network area (Year 2011) | 9491 | Nos |
| Population Density in the Network area | 1867 | No./Sq.km |
| Total sewage Load to STP(including septage) | 1.76 | MLD |
| Total Length of Network Pipe | 27406 | m |
| Length of Pumping Main | 5481 | m |
| Total Cost of Project (w/o Land cost) including O&M cost of 10 year | 113.50 | Crores |
| 0 | P | Thin |



| SI. No. | ITEM | AMOUNT |
|------------|---|---------------|
| 1100 | CIVIL ITEMS | |
| 1 | Site Preparation-LS | ₹ 4,500 |
| 2 | OG Trap, Receiving Chamber, Screen, Grit Chamber | ₹ 2,420,996 |
| 3 | Equalisation Tank | ₹ 5,816,692 |
| 4 | Dilution tank for co treatment | ₹ 1,274,343 |
| 5 | Collection Tank for Co treatment -rectangular | ₹ 554,758 |
| 6 | Primary Clarifier | ₹ 3,681,527 |
| 7 | MBBR Tank-1 | ₹ 6,277,552 |
| 8 | MBBR Tank-2 | ₹ 4,769,863 |
| 9 | MBBR Tank-3 | ₹ 2,680,891 |
| 10 | MBBR Tank-4 | ₹ 1,511,121 |
| 11 | Clarifier with Tube/Plate Settler | ₹ 1,745,782 |
| 12 | Sludge Sump and Thickener | ₹ 2,643,054 |
| 13 | Chlorine Contact Tank and Treated Water Tank | ₹ 2,255,778 |
| 14 | Filter feed tank | ₹ 868,490 |
| 15 | Buffer zone with vegetation ,Green Belt and Landscaping | ₹ 1,155,000 |
| 16 | Facility for Recycling Purposes | ₹ 150,000 |
| | Construction of administration cum laboratory building | |
| 17 | including Compound wall | ₹ 17,500,000 |
| 18 | Pump house building above wells & compound wall for well site | ₹ 6,900,000 |
| 19 | Equipment, Laboratory items, Furniture and Computer | ₹ 133,929 |
| 20 | Sewer network with pipelines, chambers and wells | ₹ 464,165,336 |
| 20 | TOTAL OF CIVIL ITEMS | ₹ 526,509,610 |
| | | X 320,309,010 |
| | MECHANICAL ITEMS | |
| 1 | Bar Screens | ₹ 1,000,000 |
| 2 | Pump sets and Aeration system | ₹ 9,719,140 |
| 3 | PSF & ACF | ₹ 6,222,220 |
| 4 | Centrifuge | ₹ 400,000 |
| 5 | Bypass arrangements, steel ladder and frame work | ₹ 350,000 |
| 6 | Piping and Valves | ₹ 200,893 |
| 7 | MBBR Carrier and other items | ₹ 7,778,179 |
| 8 | Tube settler media | ₹ 66,964 |
| 9 | Alum and Lime dosing systems | ₹ 110,000 |
| 10 | Odor control unit | ₹ 60,000 |
| 11 | Mechanical arrangement for oil & grease trap, clarifier | ₹ 525,000 |
| 12 | Electromagnetic flow meter | ₹ 223,214 |
| | TOTAL OF MECHANICAL ITEMS | ₹ 26,655,610 |

| ELECTRICAL ITEMS | | | |
|------------------|--|-----------------|--|
| 1 | Diesel Generator | ₹ 840,000 | |
| 2 | Electrical works, IoT based sensor and control units, transformer unit | ₹ 4,600,000 | |
| 3 | Solar units | ₹ 1,830,000 | |
| | TOTAL OF ELECTRICAL ITEMS | ₹ 7,270,000 | |
| | ABSTRACT OF COST | | |
| SI. No. | ІТЕМ | AMOUNT | |
| 1 | Civil Works | ₹ 526,509,610 | |
| 2 | Mechanical Works | ₹ 26,655,610 | |
| 3 | Electrical Works | ₹ 7,270,000 | |
| 4 | Road restoration charges | ₹ 173,186,813 | |
| 5 | Household Sewer connection charges @ 16500 | ₹ 33,000,000 | |
| | GST Component (18%) | ₹ 137,991,966 | |
| | DPR preparation charge @ 2.5% | ₹ 19,165,551 | |
| | Centage charges@10% | ₹ 76,662,203 | |
| | Unforeseen | ₹ 11,168,248 | |
| | GRAND TOTAL | ₹ 1,011,610,000 | |
| | Total O&M cost for10 years | ₹ 123,390,000 | |
| | TOTAL COST including 10 years O&M | ₹ 1,135,000,000 | |
| | Rupees One hundred and thirteen crores fifty lakhs only | | |

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CHAPTER - 1 INTRODUCTION

1.1 SANITATION – VISION, STATUS AND GOALS

To address the situation of inadequate sanitation facilities to the urban population, the Government of India has formally approved the National Urban Sanitation Policy in 2008 which envisions the creation of totally sanitized cities and towns. The policy articulates awareness generation and behavior change, open defecation free cities in which all urban dwellers have access to safe sanitation, integrated city wide sanitation planning and sanitary and safe disposal of urban wastes. The vision of the policy is that the municipality shall be totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all the citizens with a special focus on hygienic and affordable sanitation. The policy articulates the following goals

- 1. Awareness Generation and Behavioral Change
- 2. Open Defecation Free Cities
- 3. Integrated City Wide Sanitation
- 4. Sanitary and Safe Disposal

5. Proper Operation and Maintenance of all Sanitary Installations Wastewater disposal and treatment is a major problem in cities in Kerala.

The wastewater from toilets has been disposed through septic tanks and soaks pits and grey form of wastewater from kitchen and bathrooms is directly discharged into the sludge drains without any treatment. As per Census 2011, 45.45% of the urban households have "no drainage". There are 14.32% of the households connected to centralized sewerage system. About 97.43% of the households in the urban areas of Kerala state have a toilet within their residential premises. Almost 56.69% of them are connected to septic tanks, 21.87% to pit latrines while households having connection to the centralized sewer system are about 14.32%.

Septage management is viewed as private provision with limited role of urban local bodies. Another set of reasons cited for urgency in taking up septage management is the occupational hazards for emptying the septic tanks. The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013 has expanded the definition of workers engaged in such sanitation works by including the practice of septic tank emptying and manual handling of such faecal sludge. The revised Manual Scavenging Act will require states to gear up the Municipal bodies in discharging their responsibilities effectively. In the

absence of efficient waste water treatment systems and solid waste management systems, untreated domestic and industrial wastes, and agriculture-runoff flow into the rivers polluting the rivers in Kerala.

There has been widespread bacteriological contamination of faecal origin in ground and surface water which relate to proximity of increasing numbers of leach pit latrines, leakages from septic tanks, washing, bathing and other domestic activities.

Hence the goals for setting a sewerage strategy for a district will involve multi-faceted approach to cover every habitation and other institutions and establishments. This will render adequate results in both short term and long-term development plans. If a plan has been chalked out which can provide a systematic and flexible implementation mode, stage by stage implementation and better control over the system can be achieved.

A district level plan document for sewerage prepared by KWA will create a backbone for the subsequent formation of detailed engineering reports for ULBs. National Green Tribunal (NGT) while considering various OAs related to pollution of river streches, pollution of coastal regions, pollution of ground water and restoration of water bodies in various States and UTs has ordered that all States and UTs shall ensure that various measures are taken to prevent the pollution of river stretches, water bodies and coastal areas on priority basis and within specified time limits. One of the directions is to ensure 100% treatment of sewage at least to the extent of in-situ remediation.

Following this, being the agency for ensuring sewerage services in the State, Kerala Water Authority (KWA) has created a separate Vertical within it exclusively for preparation of DPR sewerage works across the State. The newly formed Sewerage Vertical of KWA has prepared Preliminary Engineering Report for establishing a sewerage network/ septage management across the State. As per order no GO(Rt) No.352/2021/P&EA dated 16/8/2021 Administrative Sanction has been accorded for conducting DGPS leveling survey work for 28 Urban Local Bodies and DPR preparation of 4 corporations in Kerala and Kattapana Municipality is one among them. Sewerage Circle, Kochi is assigned with the task of preparation of DPR for sewerage scheme for Kattapana Municipality in Idukki District.

1.2 NEED FOR SEWAGE TREATMENT SYSTEM

The sewerage project in respect of which considerable public and social resources are being used, form a basic infrastructure for the country and an indisputable indicator of civilization and development. The works cover a number of substantial social needs and aim to improve the quality of life and to protect public health and the environment. Some of the benefits and advantages of the sewerage system are as follows:

(a) Upgrading the quality of life : The quality of life and the hygienic conditions in the areas where the system operates have already improved. The operation of the sewerage system has relieved these areas to a great extent from previous problems that were caused by the continuous maintain septic tanks and soak pits periodically. The sewerage system provides a healthier and more appropriate way to manage liquid wastes.

(b) Preserving the natural environment

Previously, all sewage waste was discharged in septic tanks and cesspits, resulting in the pollution of the ground water of the areas where such waste was discharged. Polluted water then ended in the sea and caused various risks and other environmental problems. With the operation of the sewerage system no more pollution of ground water is effected and the discharge of sewage waste has significantly been reduced. Moreover, the wastewater treatment plant produces by-products such as treated biosolids and methane. Treated sludge is used as a soil-improving substance mainly for tree cultivations whilst methane is being used for electricity generation, covering part of the power, required to operate the plant.

c) Saving and processing waters

Water is a substantial natural resource for our country and it should be managed in the best possible manner. The tertiary treated effluent at the wastewater treatment plant is reused for agricultural and other purposes.

(d) Economic development and tourism

The most significant advantage of the system is maintaining sustainable development, the protection of the environment and improvement of the quality of life in our town, with a further impact on the development of tourism and the economy in general.

(e) Standard of living

As a result of the above, the sewerage system contributes to further development and increase of the standard of living of the town of Kattapana inhabitants. Considering all the above advantages, there is no doubt that if we all cooperate, we and our children will enjoy a better quality of life in the years to come and that we will secure a better environment.

1.3 HUMAN DEVELOPMENT OUTCOMES FOR SEWERAGE INVESTMENTS

Lack of access to improved sanitation costs countries up to 7% of their GDP annually. At the national and global levels, the human cost manifests in huge economic losses. These losses are mainly driven by premature deaths, health care treatment, lost time and productivity seeking treatment, and finding access

to sanitation facilities in urban areas and thickly populated clusters of rural areas as well. In 2012, the World Health Organization (WHO) estimated that the global economic return on sanitation spending is US \$5.5 for every one dollar invested, more than double the economic return on water spending (US\$2.0). However, the UN 2012 Global Analysis and Assessment of Sanitation and Drinking Water indicates that only 10 out of 75 countries who participated in their survey reported to have more than 75% of the funds needed for sanitation. Investment in safe water supply and access to improved sanitation has multiple economic returns. For every 1 US Dollar invested, there is a projected USD 3 to 34 benefits gained. The benefits range from time savings and productivity gains to budget savings on health-care. Per capita gains for the developing world population could reach at least USD 15 per capita per year. It is well established that aspects of women safety, dignity and well-being are intrinsically linked to improved availability, access and use of sanitation and drinking water facilities.

1.4 ORGANIZATION OF DETAILED ENGINEERING REPORT

Improved Institutional governance and enhanced human resource capacities for planning and maintaining the sewerage is also coming under the goal. Capacity building for adoptability to modern technologies and applications for the service providers is also another goal.

Chapter 1 deals with a general introduction to the subject. Vision and goals of the sewerage for entire project area and its social implications are described.

Chapter 2 describes the salient features and various aspects of the selected project area.

Chapter 3 consists of various aspects of the sewerage strategy. Methodology adopted and Plan for the sewerage treatment and the technology are described.

Chapter 4 describes the design criteria for sewerage scheme planning as per the IS standards and CPHEEO manuel.

Chapter 5 deals with the proposed sewerage scheme of the project area includes details of network, pumping main, manhole, collection well, pump sets, lifting stations etc.

Chapter 6 deals with the Technology for the design of sewage treatment plant and various components of sewerage system design as per the IS standards and CPHEO manual.

Chapter 7 consists of design details of Sewerage treatment plant units including co treatment units and collection well

In Chapter 8, estimates for all components of the sewerage project are illustrated. Detailed estimate attached in Annexure 1.

Chapter 9 deals with various aspects of operation and maintenance of the sewage treatment plant in detail. Since it is decided to impart optimum cost and functional aspects of operation, applications of modern technologies for control of the process are also dealt with.

Chapter 10 consists of the action plan for the implementation of the project.

In the concluding Chapter 11, observations gathered from the pre-feasibility studies for the planning, design of the sewerage system and recommendations for the successfulness of project is presented.

CHAPTER - 2

KATTAPANA MUNICIPALITY AN OVERVIEW AND SALIENT FEATURES

2.1 CITY PROFILE

Kattappana is a municipal town in the Sahyadri (or Western Ghats) of Kerala state, India. It is the main urban centre in the high ranges of Idukki district, situated about 2,788.71–2,952.76 feet (850.00–900.00 m) above mean sea level, in the High Ranges, the high altitude region of Kerala has recently raised to the status of municipality. Kattappana is a CLASS III urban centre and it is the first municipality in high range of Idukki district with the real terraineous touch of Idukki as Thodupuzha municipality is situated in low range.

Previously, Kattappana was included in the Udumbanchola tehsil (taluk) of Idukki district and was later included in the newly formed Idukki tehsil (taluk). In 1962, it became a grama panchayath and the first council was held in 1964. It was officially declared as municipality by the state government on 1 November 2015.

However, it was the development of the Kottayam–Kattappana road and the Puliyanmala–Thodupuzha State highway that turned the town into a commercial centre. It is a major commercial town and flourished with the boost in production of agriculture and spices. It was the agriculture sector that played a pivotal role in economically uplifting the town.

2.2 TOPOGRAPHY

The area of Kattapana lies at 907557'N latitude and 77°11539'E longitude. Minimum elevation is 723 m; Maximum elevation is 1,299 m and Average elevation is 963 m. Physiographically the project area forms part of both the midland and highland units. Descending from the heights of the Western Ghats in the east, the land slopes towards the west forming three distinct – the highlands, the plains. Some of the lofty ridges and peaks extend towards the west by a succession of hills of diminishing altitude.

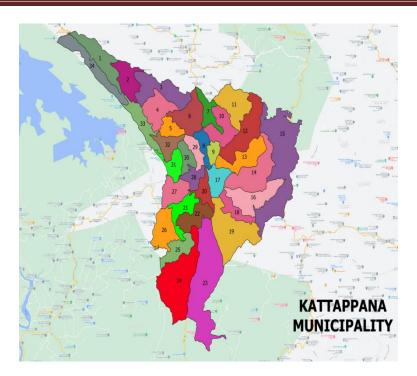


Fig.2.1 Project area -Kattapana Municipality

2.3 WATER RESOURCES

2.3.1 SURFACE SOURCE

Kattapanayar is the major river flowing through the district. The source of water supply to Kattapana Municipality is Kattapana River. Many portions of the Kattappana River have been encroached upon. The river is now a dump for waste generated in the town, and severely In Kattappana, the main sources of drinking water are ponds and borewells. In emergency situations, tanker Lorries distributes water. The households and hotels in the town depend on potable water supplied by private agencies, without any quality-check.

2.3.2 GROUNDWATER POTENTIAL

Idukki reservoir, one of the largest in Asia, has turned into a dumpyard for non-biodegradable wastes, with plastic and glass bottles, sanitary waste, and pesticide bottles flowing into the residential areas of Ayyappancoil, Kanchiyar, and Upputhara grama panchayats. When the water recedes, the waste gets deposited there. Local residents say they face this problem every year when the water inflow increases during monsoon. In summer and the garbage is either deposited on the banks or floats on the waterbody posing a threat to human life and fish.

The three panchayats are on the embankment area of the reservoir where water spreads to a large area by mid-monsoon. Once the water recedes, the area is spotted by heaps of non-bio degradable waste. The

pesticide bottles used in the cardamom hill areas of Elamala are the biggest threat. They arrive through the Periyar and float on the still water of the reservoir. Most of the aluminium bottles contain pesticides, which spread in the water. "There have been instances of large-scale fishkill in the reservoir. No studies have been conducted yet to find the reason. The urban waste from far away towns like Vandiperiyar and Kattappana to find their way to the reservoir. As the dam area is wide, waste gets deposited in the creeks and pockets of earth created by the reservoir. Anchuruly, where the Kattappana river joins the reservoir, too has its share of piled up waste that come from the Kattappana municipal area.

The Idukki Wildlife Sanctuary also faces the threat of garbage getting deposited on the banks. The scale is less when compared to the human-inhabited areas since the sanctuary is downstream of the dam. "However, the wildlife at the sanctuary is at risk since the reservoir is their main water source," according to a Forest Department official.

2.4. CLIMATE AND RAINFALL

The climate of Kattappana falls under the Köppen climate classification. The place normally experiences a moderate climate. The humidity rises from the month of March to April and mid May. The average annual temperature here is 23 °C. The months of June, July, August and October receives significant amount of rainfall. November and December are the coldest months in the year.

2.5. DEMOGRAPHY

As of 2011 Census, Kattappana had a population of 42,646, with 21,159 males and 21,487 females. Kattappana has an area of 61.32 km2 (23.68 sq mi) with 10,419 families residing in it. In Kattappana, 10.3% was under 6 years of age. The Scheduled Castes (SC) were 6% of the total population and the Scheduled Tribes (ST) were 1.23%. Kattappana had an average literacy of 95.25% higher than the state average of 94%.

2.6 LITERACY

As per the Census 2011, the literacy rate of Kattappana is 95.3%. Thus Kattappana village has higher literacy rate compared to 83.2% of Idukki district. The male literacy rate is 96.41% and the female literacy rate is 94.11% in Kattappana village.. There are 13.55% Scheduled Caste (SC) and 1.57% Scheduled Tribe (ST) of total population in Kattappana village.

2.7 POPULATION GROWTH

As per the census in year 2011, total population is 42646 and in year 2001, population is 39608 which show 7.67% growth increase. But the study during the last decade (2001-2011) for Idukki district shows a growth decrease of 1,79%.

| GROWTH RATE OF POPULATION IN IDUKKI DISTRICT | | | |
|--|--------------------|--|--|
| Census Year | Growth rate (in %) | | |
| 1901-11 | 108.88 | | |
| 1911-21 | 9.239 | | |
| 1921-31 | 72.59 | | |
| 1931-41 | 30.17 | | |
| 1941-51 | 35.67 | | |
| 1951-61 | 74.98 | | |
| 1961-71 | 31.75 | | |
| 1971-81 | 26.91 | | |
| 1981-91 | 10.95 | | |
| 1991-01 | 7.03 | | |
| 2001-11 | -1.79 | | |

Source: Census handbook of Idukki

2.8 AGRICULTURE

Kattappana is the center for spices trade and the primary producer of cardamom and black pepper. The main occupation of people of Kattappana is agriculture. A specific type Njallani high yielding variety of cardamom, was developed in Kattappana. It is also the centre of production and marketing of coffee, cocoa and ginger. There are also several reputed tea plantations (Tata Tea, A V Thomas & Co, Malayalam Plantations, Kannan Devan etc.) in adjoining areas of the district.

Spices Board (erstwhile Cardamom Board under Government of India) has an office in Kattappana. A Spices Park is established at Puttadi near Kattappana. Cardamom Research Institute is situated at Pampadumpara.

2.9 A COMMERCIAL HUB OF HIGH RANGE REGION

Despite being the commercial hub of the High Ranges, most of Kattappana was shown in official records, as part of forest area, owned by the government. Granting title deeds to the land owners and farmers, had been a vote-catching slogan, raised by successive state governments. With the removal of legal hurdles, the Government has ordered issue of condition-free titles to the farmers in November 2010. There is a mini Industrial estate in Kattappana.

Large quantity of potable water is necessary for all the development works of the City. A survey was conducted under KWA to assess the requirement of major consumers and the project is prepared considering the above aspects. 80% of this water is assumed to be coming as waste water which has to be properly treated and disposed off. In addition to this, the seepage water and rain water are also considered while arriving at the quantity of sewage.

CHAPTER - 3

PLAN OF SEWERAGE TREATMENT SCHEME

3.1 GENERAL

In this Chapter, general aspects of sewage collection, treatment and disposal for the Kattapana Municipality is described. For core area of the Municipality, sewer network consisting of pipeline network is planned to be laid underground to collect sewage load from various nodes in the system across the project area. The sewage network system is consisting of manholes at the interval of 30 m in normal cases and at every bends in vertical and horizontal planes. Whenever there is a variation in diameter, manholes are provided. To reduce depth of cutting, lifting manholes are provided with sewage lifting pumps of smaller capacities. Solar power and diesel generator backup power is also provided to get uninterrupted working of the system. IoT enabled monitoring of the sewerage system is envisaged with a control station inside the Sewage Treatment Plant (STP). The locations in the project area without having sewer network are included in the septage management plan. Using septage transportation system, sludge from various points is collected and diluted using cotreatment facility at STP area and treated along with sewage. Sewage Treatment Plant is designed for primary treatment and subsequent bacteriological and chemical treatment process. Finally, sludge handling units are planned to be provided. The recycled water can be taken for agricultural and other commercial and industrial purposes and for recharging water bodies and to alleviate any pollution loads.

3.2 PRESENT SEWERAGE SYSTEM- OVERVIEW

Like all other Municipalities in Kerala, Kattapana Municipality is also not having a sewerage system. All the residential building, commercial buildings, institutional establishments are having their own septic tanks for collecting sewage from latrines and grey water is either collected in leach pits or directly disposed to drainage system and nearby canals. Most of septic tanks are unscientifically constructed and do not have the facility for treating the effluent resulting in contamination of surroundings and the ground water .Even though Hospitals and other institutions are having their own independent facilities, in most cases partly treated effluent is discharged to nearby drains or water bodies. Most of dwellings have their own wells as drinking water source and proximity to the septic tanks leads pollution in well water also. Coliform bacteria are detected in 70% of wells in Kerala and emphasizing the need for a well-planned sewerage system. Anchuruly, where the Kattappana river joins the reservoir, waste is piled up which come from the Kattappana municipal area.



Fig 3.1: Contaminated area in Anchuruly near kattapana

3.3 METHODOLOGY FOR PREPARATION OF SEWERAGE MASTER PLAN

The following tasks have been performed during the planning of the proposed Sewerage System:

- Data Collection and Field Visits
- Review of adequacy of existing sewerage system
- Field leveling survey using DGPS
- Social survey
- Population Projection and Sewage Flow Estimation
- Design of Sewage Collection System
- STP site identification, assessing area requirement

Discussions with Municipality authorities and scheme presentation in the council for land availability

- phasing of construction of STP
- Capital cost and O & M costs

3.4 FIELD INVESTIGATIONS

General Field investigations like topographic survey, geotechnical investigation, and sewage samples analysis has been conducted to ascertain the topography of the area, population density, the soil classifications and to ascertain its characteristics for designing the type of treatment, which forms the basis for proceeding further in designing the sewerage system.

3.4.1 TOPOGRAPHICAL SURVEY WITH DGPS

Topographical survey forms a very important component in formulating the sewerage project. A detailed topographical survey has been performed covering the area using DGPS and Total Station.



Fig 3.2: DGPS Survey conducted in Kattapana Municipality

Topographical survey of the project area was conducted using DGPS and Total station. Ground Levels have been taken along the roads at suitable intervals along straight portions and at all junctions of alignment. Important features and obligatory points like junctions such as culverts, major drains, and public utilities, cross roads, railway line have been captured. Using the topographical survey data and detailed base map showing the features like roads, land marks, public buildings, parks etc. has been developed.

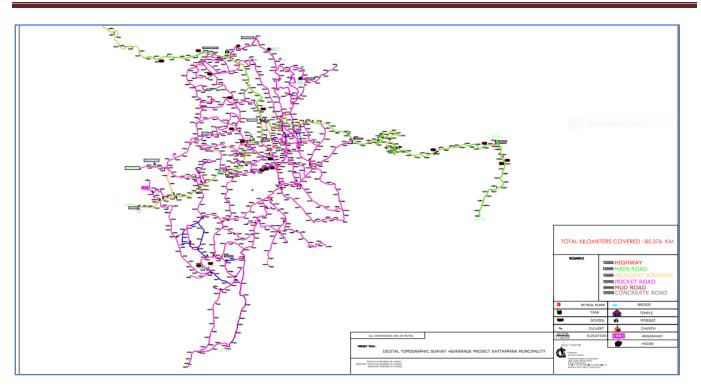


Fig 3.3: DGPS Survey levels

3.4.2 SOCIAL SURVEY

Social Survey was carried out for locating each buildings for arriving the sewer load in manholes. Identifying and arriving possible shock loads from institutions such as hospitals, flats, and other establishments are very important for avoiding overflows in manholes. Identifying the buildings which are not feasible to be connected to network, for arriving septage load /separate pumping arrangements is also carried out in social survey. Moreover the areas likely to be developed in future are to be identified for arriving sewer load to be incorporated in design. Major Non domestic institutions identified are listed below.

- ➢ Govt.Taluk hospital
- St.Johns hospital
- ➢ Co operative hospital
- Ortho hospital
- Bala hospital

- Ossanam English medium school
- St.Johns school of nursing & B Pharm.
- Infant jesus residential school
- ➢ St George HSS
- St Sebastian College
- Govt.Industrial training Institute(ITI)
- ➢ Govt.tribal HSS

- Kapuchian Ashramam
- ➢ SH Convent
- St.Martha Convent
- Womens hostelst.Johns
- Theatre

3.5 COMPONENTS OF SEWAGE NETWORK

| SI. No. | Type of element | Material | Function | |
|------------|-----------------|-------------------------------------|---|--|
| 1 | Chambers | Reinforced concrete | Collection of sewage from individual units for transferring to manholes | |
| 2 | Sewer pipelines | High Density Polyethylene (HDPE) | Transfer of sewage by gravity flow from one point to other | |
| 3 | Manholes | Reinforced concrete | Sewage collection points and inspection areas for removing blocks and cleaning of lines | |
| 4 | Lift manholes | Reinforced concrete | Sewage collection points and inspection areas for removing blocks and cleaning of lines and lifting of sewer load to the next manhole. Submersible pump sets are installed inside in such manholes. | |
| 5 | Collection well | Reinforced concrete | Centralised collection point for sewer load from a subzone in the project area. | |
| 6 | Pumping station | Reinforced concrete | Centralised collection point for sewer load from a subzone in the project area and pumping of sewage to the next well or STF | |

The components of the sewage collection and carriage network consist of the following elements:

Table 3.1 Components of sewerage network

3.6 DESIGN OF SEWAGE NETWORK

For the design of sewage network, hydraulic analysis was performed for the initially planned network and refined for a set of constraints and inflow values. The pipelines are designed for gravity flow conditions except for lifting and collection points. Minimum outer diameter of the pipeline was taken as 180 mm for main lines along the roads and for carriage from chambers to manholes, with material as HDPE. The slope was taken as a minimum value of 1 in 170 in general and care has been taken to provide sufficient slopes to generate self-cleansing velocities during peak flow conditions when the pipe is near to full in load. All stipulations given by the relevant Indian Standard Codes of practice and CPHEEO Manual has been adopted in design.

3.6.1. CREATING PRIMARY MODEL FROM GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Using GIS data available, the project area was examined thoroughly, and a primary model of sewer flow was generated. This model was later refined using reduced elevations obtained from Differential Global Positioning System (DGPS) Real Time Kinematic Survey (RTK) values at the control points established in the primary model. The GIS provides information of population density scatter, presence of water

bodies, road network and topographical features as a quick reference for planning an optimum site for the STP as well as the routing of sewer load.

3.7 SEPTAGE

Septage or septic tank waste refers to the partially treated matter stored in and pumped out of a septic tank. In other words, fecal sludge from septic tanks is known as Septage, but fecal sludge and Septage are interchangeably used in India. Septage is a by- product of pretreatment of household wastewater in a septic tank where it accumulates overtime. It is generally pumped out of a septic tank or onsite sanitation system using a vacuum tanker. Septage is the liquid and solid material that is pumped from a septic tank, cesspool, or other such onsite treatment facilities after it has accumulated over a period of time.

For the purpose of planning sewerage/septage management systems for this proposal the project area is broadly categorized into two: areas with higher population density and areas with lower population density. Networked sewerage system with STPs is proposed for the first category which is the city area of kattapana. Furthermore, septage treatment is proposed in densely populated areas where there is no road network and low lying area. Septage load from non network area of Kattapana Municipality is proposed to be transported to the proposed STP plant where Co treatment facility will be provided.

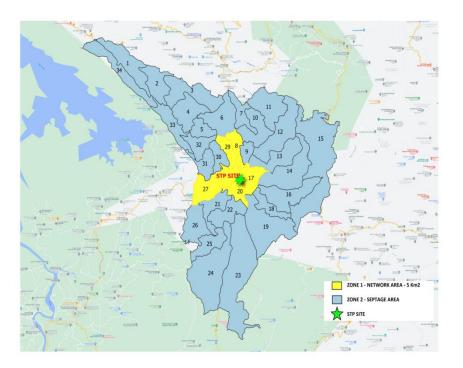


Fig 3.4: Zoning of Project scheme area and STP location

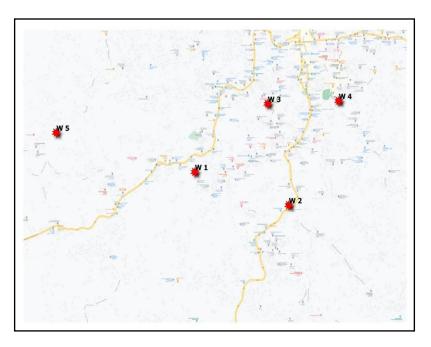


Fig 3.5: Collection well locations

3.8 PLAN FOR REUSE OF RECYCLED SEWAGE

In the planning and implementation of water reclamation and reuse, the reclaimed water application will usually govern the wastewater treatment needed to protect public health and the environment, and the degree of reliability required for the treatment processes and operation (Metcalf and Eddy). The major wastewaters re use categories are as follows:

- a] agricultural irrigation, crop irrigation and commercial nurseries
- b] landscape irrigation
- c] industrial recycling and reuse
- d] groundwater recharge, groundwater replenishment and saltwater intrusion control
- e] recreational/environmental uses
- f] non-potable urban uses
- e] potable reuse

In the present project, the dewatered sludge can be used as manure for cultivating vegetables and other plant life.

3.9 INTEGRATION WITH OTHER PROJECTS

Planning and design of sewerage schemes can be combined with other water resources projects also. This is since most of these projects are inter-related and environment sensitive. Hence the location of an STP, collection wells and coverage of sewage networks in an area depends upon the water supply system existing in that area, proximity of irrigation canals, water bodies and flood routing structures if any. The integration of different projects related to the water resources and conservation schemes greatly influence the successful establishment and operation of the sewerage schemes in an area. The integrated planning of the projects associated with water resources will contribute effectively for a successful sewerage system.

CHAPTER - 4 DESIGN CRITERIA

4.1 SEWAGE COLLECTION & CONVEYANCE SYSTEM

The sewerage system or storm water carriage system can be separate system or combined system or partially separate system depending on domestic sewage and rain water are drained through two separate set of pipes or through single set of piping. However, the combined system is not quite suitable in tropical Indian conditions as;

- i) Heavy and concentrated rainfall occurs during the monsoon period and thus there is a large variation in the quantity of sewage during different months of the year,
- Dry weather flow is generally a very small proportion of the total flow and hence sewers are likely to get silted up due to low velocity of flow in lean periods,
- iii) Capital funds are limited,
- iv) Treatment costs and pumping costs are significantly reduced in separate system due to reduction in quantity.
- v) If the system is overdesigned, external flushing to attain the areas where the self-cleansing velocity is not attained which will increase the O&M cost. It affects system efficiency.

The pipes for collection can have;

- vi) Zonal pattern in which entire city is divided into suitable zones and a separate interceptor is provided for each zone,
- vii)Radial pattern in which sewers are laid radial outwards from the center of the city to dispose sewage at multiple points,
- viii) Interceptor pattern in which sewers are intercepted by large size sewers laid along the natural watercourses or,
- ix) Fan pattern in which the STP is located at a certain point and the entire sewage flow is directed towards this point.

4.2 ESTIMATION OF QUANTITY OF SEWAGE

Separate drainage system is proposed for rain water as such only dry weather flow will pass through sewers. The connection of roof, backyard and foundation drains to the sanitary sewers should be avoided and hence shall not be considered for estimation of sanitary sewage. The prevalent sewerage systems in India do receive rain water even if separate system for rain water exists but sewers are designed for 30 years and have spare capacity in early phases of implementation and considering that by end of 30 years

sewerage system will become water tight to rain water, it is appropriate to design system assuming no rain water penetration in sewers. The quantity of domestic sewage can be best estimated by quantity of water supply consumption minus evaporation plus sewage flow from personal water sources which are other than those of community water supply and this water reaching to sewers. Another important factor in Indian cities is generally less connectivity of sewage to the sewerage system as many people continue to use on site sanitation i.e. septic tanks and soak pits etc. particularly in colonies where sewerage system is laid after a long gap of construction of houses which is a general phenomenon in Indian cities. In actual practice about 70-80% of the water supplied is reaching to sewers. As such 80% of quantity of water supply can be taken as sewage generation.

4.2.1 INFILTRATION AND LEAKAGE.

Some quantity of ground water or subsoil water may infiltrate into sewers through defective joints, broken pipes etc. This is significant when water table is high and head of ground water is more than the head of sewage in sewers. Some quantity of sewage may leak out from defective joints and defective pipes when head of sewage is more in sewers than head of ground water outside. Infiltration and leakage mainly depends on quality of construction and water table levels. Infiltration can be considered 5000-50000 liters per day per hectare or 500-5000 liters per day per km length of sewers or 250-500 liters per day per manhole for sewers laid below ground water level.

4.2.2 ESTIMATION OF INDUSTRIAL SEWAGE

The quantity of industrial sewage will vary with type and size of industry, the manufacturing processes involved, degree of water reuse and onsite treatment methods that are used, if any. However, in general the quantity of industrial sewage may be taken 80 to 90 % of quantity of water supplied through public water supply system. Some industries develop their own source of water supply and may discharge their liquid waste into sewers. This should be estimated separately for large industries. It may, however, be stated that industrial sewage should be treated to the standards prescribed by the Pollution Control Boards before being discharged into sewers.

4.3 DESIGN PERIOD

Sewerage projects are normally designed to meet the requirements over a period of 30 years after their completion. However, the period of 30 years may be modified in respect of certain components of the project depending on their useful life or the facility for carrying out extensions when required and rate of interest, so that expenditure far ahead of its utilization is avoided. As such design period for various main components has been taken as indicated in Table below.

| SI. No | Design Component | Design Period | Remarks | |
|-----------|--|---------------|---|--|
| 1 | Land Acquisition for STP, SPS, sewers etc. | 30 Years | Land acquisition in future difficult | |
| 2 | Sewer network (laterals, Trunk mains, Outfall etc.) | 30 Years | Replacement difficult and costly | |
| 3 | Pumping mains | 30 Years | Cost may be economical | |
| 4 | Pumping Stations- Civil Work | 30 Years | Life of civil structure is 30 years | |
| 5 | Pumping Machinery | 15 Years | Life of pumping machinery is 15 years | |
| 6 | Sewage Treatment Plants | 30 Years | The construction shall be modular in phased manner as actual population less than design population and in Indian cities initially flows are much less due to connectivity problems | |
| 7 | Effluent disposal and utilization | 30 Years | Provision of design capacities in the initial stages itself is economical | |

Table 4.1: Design Period of Sewerage Components

4.4 VARIATION IN RATE OF FLOW

The rate of flow of sewage varies from season to season (seasonal or monthly variation), from day to day (daily variation) and from hour to hour (hourly variation). For design of sewers maximum or peak flow rates are adopted. The value of peak factor (ratio of maximum flow to average flow) depends on the contributing population and the values recommended in the Manual on Sewerage and Sewage Treatment prepared by CPHEEO are given in Table below.

| Contributing Population | Peak Factor |
|--------------------------------|--|
| Up to 20,000 | 3.00 |
| 20,000 - 50,000 | 2.50 |
| 50,000 - 7,50,000 | 2.25 |
| Above 7,50,000 | 2.00 |
| | Up to 20,000 20,000 – 50,000 50,000 – 7,50,000 |

Table 4.2: Peak Factor

The variation between maximum and average rates of flow is large for domestic and lateral sewers because they receive the flow directly from the source. This variation gradually diminishes as the flow reaches the branch or sub main sewers and the main sewers.

Minimum rate of flow: The minimum rate of flow may vary from 0.5 to 0.33 of the average flow.

4.5 HYDRAULIC DESIGN OF SEWERS

The design for sewage collection system presumes flow to be steady and uniform. The unsteady and nonuniform sewage flow characteristics are accounted in the design by proper sizing of manhole. The sewage is mostly liquid containing about 0.1% of solid matter and hence follows same laws of flow as water. However the difference in design for water supply network and sewer network is, i) In order to avoid clogging of sewers due to settlement of heavier particles of solids, sewers are to be laid at such gradient that self-cleansing velocity is achieved at all values of discharge and that the inner surface of the sewers should be capable of resisting the wear and tear due to abrasive action of solid particles and ii) sewage flows under gravity as open channel flow and as such sewers are laid at continuous downward gradient.

4.5.1 DEPTH OF FLOW

The sewers shall not run full as otherwise the pressure will rise above or fall below the atmospheric pressure and condition of open channel flow will cease to exist. Moreover, from consideration of ventilation, sewers should not be designed to run full. In case of circular sewers, the Manning's formula reveals that:

The velocity at 0.8 depth of flow is 1.14 times the velocity at full depth of flow.

The discharge at 0.8 depth of flow is 0.98 times the discharge at full depth of flow.

Accordingly, the maximum depth of flow in design shall be limited to 0.80 of the diameter at ultimate peak flow.

4.5.2 HYDRAULIC FORMULAE FOR DESIGN OF SEWERS

Manning's formula has been used for design of sewers in case of gravity flow. For pressure flow (Pumping Mains), the Hazen-William's formula has been used. Sewer Network design has been done with the help of Manning's Formulae i.e. Velocity $V = [(1/n) \times (R2/3 \ .S1/2)]$ (in m/s) For Circular Sections $V = (1/n) (3.968 \times 10-3D2/3S1/2) Q = (1/n) (3.118 \times 10-6D8/3S1/2)$ Where, Q = discharge in lps; S = slope of hydraulic gradient; D =internal dia of pipe line in mm; R = hydraulic radius in m; n = Manning's Coefficient of roughness

4.5.3 PER CAPITA SEWAGE FLOW

The rate of water supply has been adopted 150 LPCD at consumer end throughout the whole design period as water supply schemes are designed with per capita supply of 150lpcd in Kerala. 80 percent of the water supply has been considered as sewage flow into the sewerage system

4.5.4 MINIMUM VELOCITY OF FLOW

A minimum velocity of 0.6 m/s for present peak flow and 0.8 m/s at design peak flow is recommended for sanitary sewers. Thus the sewers are designed on the assumption that although silting might occur at minimum flow, it would be flushed out during peak flows.

4.5.5 RECOMMENDED SLOPES FOR MINIMUM VELOCITY

For sewers running partially full, for a given flow and slope, velocity is little influenced by pipe diameter. As such for present peak flows up to 30 lps, the slopes given in Table below may be adopted which would ensure minimum velocity of 0.6 m/s in the early years.

| S.N | Present Peak Flow in LPS | Slope per 1000 |
|-----|--------------------------|----------------|
| 1 | 2 | 6.0 |
| 2 | 3 | 4.0 |
| 3 | 5 | 3.1 |
| 4 | 10 | 2.0 |
| 5 | 15 | 1.3 |
| 6 | 20 | 1.2 |
| 7 | 30 | 1.0 |

Table 4.3: Recommended slope

4.5.6 EROSION AND MAXIMUM VELOCITY OF FLOW

Erosion of sewers is caused by sand and other gritty material in the sewer and also by excessive velocity. Non-scouring or limiting velocities in sewers of different materials are given in CPHEEO manual. Accordingly maximum velocity for cement concrete pipes is 2.5- 3.00 m/s.

4.5.7 SEWER TRANSITIONS

Sewers shall be designed to ensure that the energy gradient is a continuous smooth line, thus transitions from larger to smaller diameters shall not be made. The crowns of sewers shall be kept continuous. In no case, the hydraulic flow line in the large sewers shall be higher than the incoming sewer. To avoid backing up, the crown of outgoing sewer shall not be higher than the crown of incoming sewer

4.5.8 MINIMUM PIPE DIAMETER

Minimum pipe diameter recommended in CPHEEO manual is 150 mm except that in hilly areas, where extreme slopes are prevalent, 100 mm can be used. Some states and ULBs have started adopting minimum diameter as 200 mm or even 250 mm. The logic is Maintenance of sewer system is generally not good and 150 mm dia sewer will block frequently and remain un-attended for some time, Quality of construction in smaller size RCC main such as 150 mm is not good, The sewerage system is not totally closed one and undesired waste such as solid waste and drains finds way in sewerage, making smaller size sewer lines more prone to frequent blocking, The cost of pipe line element is only about 15 percent of total project cost and increase in pipe size from minimum of 150 mm to minimum of 200 mm size will increase cost of project by 2 percent whereas flow capacity increases by more than 80 percent.

The minimum diameter may be adopted as 200 mm for cities having present / base year population of over 1 lakh. However, depending on growth potential in certain areas even 150 mm diameter can also be

considered. However, in towns having present / base year population of less than 1 lakh, the minimum diameter of 200mm shall be adopted.

The house sewer connection pipe to public sewer shall be (a) minimum 100 mm or higher based on the number of houses / flats connected and (b) subject to the receiving public sewer being of higher diameter. In this project 200 mm diameter has been suggested as minimum diameter in design of sewerage network.

4.6 MATERIAL OF CONSTRUCTION FOR GRAVITY SEWERS

Brickwork is used for large diameters as sewers can be constructed in any shape. However now it is not common. Concrete pipes are commonly used now as can be manufactured to any reasonable strength and laying is easy and jointing is leak proof. However these pipes are subject to corrosion where acid discharges are carried or where velocities are not sufficient to prevent septic conditions or where the soil is highly acidic or contains excessive sulphates. Only high alumina cement concrete should be used when it is exposed to corrosive sewage or industrial wastes. Salt glazed stoneware pipes are mostly manufactured in sizes 80-1000 mm but sizes greater than 380 mm are generally not used due to economic considerations. The length of these pipes is 60 cm75 cm and 90 cm. These pipes are good for corrosion resistance and erosion resistance. However due to less length, more joints, difficulty in jointing, requirement of special bedding and less compressive strength of pipes manufactured in India; use of these pipes is reducing in India.

| S . N | EVALU ATION CRITERIA | RCC PIPES | DI PIPES | HDPE PIPES | DWC HDPE PIPES |
|-------|----------------------|---|---|-----------------------------------|--|
| 1 | Type of Joint | Available in both collar and S&S joints. | Tyton joint With rubber gasket | Butt fusion welding process | Simple push fit joints with Elastomeric sealing Ring for online system or with extra couplers. |
| 2 | Weight | Heavy | Lighter than R.C.C. | Light | Very Light in Comparison of Other Solid Wall Pipes |
| 3 | Corrosion resistance | To prevent corrosion sulphate resistant cement concrete to be used for pipe manufacture | Protective layers are Required to protect corrosion | Highly corrosion resistant | Highly corrosion resistant |

| 4 | Remarks on Cost | NP2 is Cheapest | Costlier than | Smaller | Uses minimal |
|----|-------------------|----------------------|------------------|-----------------|------------------|
| | | among all | other pipes but | diameter pipes | material for |
| | | materials | cheaper than | are cheaper | equal strength, |
| | | | HDPE pipes | and higher | therefore cost |
| | | | | diameter Pipes | cheaper from |
| | | | | are costlier | other pipes |
| 5 | Infiltration | Infiltration is less | Infiltration is | Infiltration is | Infiltration is |
| | | | very less | very less | very less |
| 6 | Workability | due to heavy | Good | Light weight | They are user |
| | | weight handling | | for easy | friendly, very |
| | | to be done with | | handling | fast and |
| | | care | | | inexpensive in |
| | | | | | installation |
| 7 | Jointing | Jointing is easy in | Jointing is easy | Jointing is | Joining time is |
| | | S&S pipes with | in S&S pipes | expensive | 2-5 minutes |
| | | Rubber ring | with Rubber | | per joint |
| | | joints | ring joints | | |
| 8 | Maintenance | Almost nil if | Minimum | Pipe ma y get | Maintenance is |
| | | proper velocity is | | damaged due | low because of |
| | | maintained | | to rodding | non adherence |
| | | | | | of sewage |
| | | | | | elements |
| 9 | Previous Experien | It is durable pipe | . Performance | Recent use | They are |
| | ce/Performance | | is yet to be | started in | maintenance |
| | | | proven | India. It is | free and |
| | | | | durable. | therefore, once |
| | | | | | installed, will |
| | | | | | lie |
| | | | | | underground |
| | | | | | for years |
| 10 | Trenchless | Micro tunneling | Micro | HDD & Micro | Not suitable for |
| | compatibility | | tunneling | tunneling | Trenchless |

Table 4.4: Pipe material Comparison

AC pipes cannot stand high superimposed loads, subject to corrosion from acids in sewage and high sulphate soils, require special bedding and weak against erosion where high velocities are encountered; as such use of AC pipe is not prevalent. Cast iron, DI and steel pipes are not used due to high cost. uPVC pipes are manufactured in sizes 75, 90,110, 140, 160,250,290 and 315 mm outer dia. uPVC pipes are smooth, light, easy to joint and have leak proof joint. Rates are also low. These days these pipes are used for making connection from house to sewer but not prevalent in street sewers.

GRP pipes are widely used in other countries where corrosion resistant pipes are required at reasonable rates. When using concrete or reinforced concrete, high density sulphur resistant cement should be used. These pipes are made of slag cement that contains fewer calcareous (CaOH2) particles than pipes made of Portland cement. These particles react with the sulphuric acid (created by bacterial dissipation of hydrogen sulphide) in sewers, causing the aforementioned crown corrosion. If this particular cement is

not used, lifetime of concrete sewers cannot be expected more than 30 years. A comparative study of characteristics of various pipe options for gravity sewers is presented in table above.

4.6.1 BENEFITS OF HDPE PIPES FOR SEWERS

When compared to other common wastewater piping system materials, such as PVC, ductile iron, or concrete, HDPE pipe offers significant benefits. Some of these include:

• Chemical Resistance. Hydrogen sulfide gas (H2S) corrosion is a serious threat to conventional sewer lines, like concrete and ductile iron, greatly reducing their service life. WL Plastics HDPE pipe is not attacked, corroded or degraded by H2S, ensuring a service life of 100 years.

• Anti-corrosive properties: HDPE piping systems are immune to the harmful effects of corrosion and tuberculation, common factors that reduces the operational life of concrete and ductile iron wastewater systems. HDPE also resists other corrosive or harmful agents, including scaling and organics such as fungi, bacteria, and other microbial contaminants.

• Leak-free:. HDPE pipe is joined together via heat fusion, creating a welded, leak- free joint unlike conventional bell and spigot joints. These leak-free joints prevent infiltration and exfiltration making it a truly sanitary piping system.

• Durability. HDPE pipe is resistant to fatigue from water hammer and surge events in sewer force mains. HDPE pipe is also abrasion resistant, ensuring that flowing water and slurries won't damage the pipe throughout its service life.

• Lightweight.: HDPE pipes are much lighter in weight compared with ductile iron or concrete alternatives, which makes transportation and installation significantly easier and safer.

• Cost-effectiveness. HDPE pipe is cost competitive with other sewer pipe options. HDPE pipe is faster, easier, and safer to install due to longer cut lengths and more linear footage per truck, which significantly reduce the overall project costs. With low maintenance costs and long service life, HDPE pipe is the ideal solution for wastewater systems.

However, HDPE pipes are slightly costlier compare to RCC pipe but as of now most of sewer pipes are laid through Trenchless technology method and because of this, plastic pipes like HDPE/ uPVC are most suitable and easy to use for trenchless as well as open cut trench method for pipe laying. The use of HDPE pipes are more economical and to be considered for smaller diameter pipes upto 110mm where they are available on coils thereby avoiding joints. Hence lesser number of joints thereby reducing leaks and the rates of pipes are reasonable. As a general pipe policy decision for the use of HDPE pipe shall be preferred up to 200mm & occasionally upto 350mm (source- KWA pipe policy, page 19). Therefore,

considering the above benefits of HDPE pipe over RCC pipes, HDPE pipes are recommended to use for maximum stretch of network. The pipe policy of KWA also favours adoption of HDPE pipes. However, RCC pipe (HDPE lined) has been recommended for higher diameter pipe (i.e. above 700 mm) as HDPE pipes for higher diameter pipes are not easily available and very costly for large diameter and generally not manufactured.

4.7 MANHOLES

A manhole is an opening constructed on the alignment of a sewer for facilitating a person to access the sewer for the purpose of inspection, testing, cleaning and removal of obstructions from the sewer line.

Manholes will be located at:

- Change of direction
- Change of slope
- Change of pipe diameter
- Change of material
- Ginning of each line at points of branches Manhole Sizes

| Dia. of MH in mm for the given Dia. of sewer and Depth of MH | | | | | | | | | |
|--|-----------------------|-----------|----------|--------|--|--|--|--|--|
| Dia. of Outgoing | Depth of MH in Meters | | | | | | | | |
| Sewer in mm | 0-0.9 | 0.91-1.65 | 1.66-2.3 | 2.31-6 | | | | | |
| 200 | 900 | 900 | 900 | 900 | | | | | |
| 250 | 900 | 900 | 900 | 900 | | | | | |
| 300 | 900 | 900 | 900 | 900 | | | | | |
| 350 | 900 | 900 | 900 | 900 | | | | | |
| 400 | | 900 | 900 | 1200 | | | | | |
| 450 | | 900 | 1200 | 1200 | | | | | |
| 500 | | 1200 | 1200 | 1200 | | | | | |
| 600 | | 1200 | 1200 | 1200 | | | | | |

Table 4.5: Recommended Size of manholes

4.7.1 TYPE OF MANHOLES

4.7.1.1 STRAIGHT – THROUGH MANHOLES

The simplest type of manhole is that built on a straight run of sewer with no side junctions. Where there is change in the size of sewer, the soffit or crown level of the two sewers should be the same, except where special conditions require otherwise.

4.7.1.2 JUNCTION MANHOLES

A manhole is provided at every junction of two or more sewers, and the curved portions of the inverts of tributary sewers have been formed within the manhole. The gradient of the smaller sewer may be steepened from the previous manhole sufficiently to reduce the difference of invert level at the point of junction to a convenient amount.

4.7.1.3 DROP MANHOLES:

As per CPHEEO manual, drop manhole is to be provided when a sewer connects with another sewer, where the difference in level between water lines (peak flow levels) of main line and the invert level of branch line is more than 600mm or a drop of more than 600mm is required to be given in the same line and it is uneconomical or impractical to arrange the connection within 600mm. The drop pipe may be either outside the manhole shaft and encased in concrete or supported on brackets inside the shaft. If the drop pipe is outside the shaft, a continuation of the sewer should be built through the shaft wall to form a rodding and inspection eye, which should be provided with a half blank flange. If the drop pipe inside the shaft, it should be in cast iron/ductile iron and it would be advantageous to provide adequate means for rodding and water cushion of 150mm depth should also be provided. The drop pipe should terminate at its lower end with a plan or duck-foot bend turned so as to discharge its flow at 45 degrees or less to the direction of the flow in the main sewer and the pipe, unless of cast iron, should be surrounded with 150mm concrete.

4.7.1.4 FLUSHING MANHOLES

Where it is not possible to obtain self-cleansing velocities due to flatness of the gradient especially at the starting point of branch sewers which receive very little flow, it is essential that some form of flushing device to be incorporated in the system. Flushing can be very conveniently accomplished using a fire hydrant or tanker and hose pipe. The upper reaches of lateral sewers, the discharges shall be partially full even at the ultimate design flow conditions, because of necessity of adopting the prescribed minimum size of sewer. In such situations, flushing arrangements have to be provided in the initial years.

4.7.2 MATERIAL OF CONSTRUCTION FOR MANHOLE

4.7.2.1 BRICK MASONRY MANHOLES

Bricks used for construction of manholes shall conform to the relevant Indian Standards. They shall be sound, hard and homogeneous in texture, well burnt in kiln without being vitrified, table moulded, deep red, cherry or copper coloured, of regular shape and size and shall have sharp and square and parallel faces. The bricks shall be free from pores, chips, flaws or humps of any kind. Bricks containing unground particles and/or which absorb water more than 1/6 th of their weight when soaked in water for twentyfour hours shall be rejected. Over burnt or under burnt bricks shall be liable to rejection. The bricks shall give a clear ringing sound when struck and shall have a minimum crushing strength of 35 Kg/sq.cm unless otherwise noted in drawings. The class and quality requirements of bricks shall be as laid down in IS: 1077. The size of the brick shall be 23.0 x 11.5 x 7.5 or unless otherwise specified. Mortar for brick masonry shall be prepared as per IS: 2250. Manholes shall be constructed in brick masonry with cement mortar (1:4), 20 mm thick inside plaster with plasticized water proofing material consisting of 12 mm thick backing coat in CM 1:3 and 8 mm thick finishing coat in CM 1:1 and 15 mm thick outside plaster in CM 1:3. Whenever a pipe enters or leaves a manhole, bricks on edge must be cut to a proper form and laid around the upper end of the pipe so as to form an arch. All around the pipes, there shall be a joint of cement mortar (1:2) 13 mm thick between it and the bricks. The manhole base has been kept as 150mm for manholes upto 1 mdepth, and 200mm for manholes from 1 to 2 m depth and 300 mm for greater depths. In all cases, the thickness shall be counter checked for uplift conditions based on maximum ground water elevations at the site on the soil side by considering empty manhole conditions. The thickness of walls shall be typically one brick up to 1.5 m deep manholes, one and a half brick for depths greater than 1.5 m. The actual thickness in any case shall be verified on the basis of engineering design in difficult soil conditions

4.7.2.2 RCC MANHOLES

The idea of RCC manholes is essentially to quicken the work of construction in the roads by adopting precast sections assembled at site. Thus, the issues related to their construction are more of design itself and quality control in casting. In general, plain and reinforced concrete work for manholes shall be carried out in accordance with the specification given in CPHEEO manual otherwise specified in this specification. Wherever good quality of brick and workmanship of the construction cannot be ensured, it is advisable to go in for RCC manholes. The provisions of IS: 456 and IS3370 Part I, II and IV shall inter alia apply to the design. The entire structure shall at all times be designed to the condition where the ground water is at ground level itself and the inside is empty and there is no superimposed load on the

manhole and not considering the skin friction of the manhole side wall with the soil. Now the newly available precast RCC chambers shall be conveniently used for the manholes upto 6.0m or more depth. This will make the construction very easy and faster.

4.7.2.3 HDPE MANHOLES

Polyethylene manholes remain leak-free because there is no chemical attack. The toughness of polyethylene eliminates the chance of cracking during installation. There is no infiltration of external ground water, reducing the amount of treatment required. There is no exfiltration of sewage to the environment. HDPE manholes are available with ladders installed. Ladder design has been inspected and meets all OSHA dimensional requirements

CHAPTER - 5 PROPOSED SEWERAGE SYSTEM

5.1 POPULATION PROJECTION

Population of the city normally depends on factors such as birth and death rates, migration, industrial development, general environmental conditions etc. Usually the population forecast of a city is made on the basis of methods of population forecast as provided for in section 1.5 of the CPHEEO manual for sewerage and sewerage treatment. The latest available census records are that of 2011.

As far as Kerala is concerned it is quite different from other states on education, health, life expectancy etc. The demographic pattern of the state therefore is quite different and need to take into account all the developmental parameters so as to avoid undue over designs. The anticipation of future growth in any community in terms of population or commercial and industrial expansion forms the basis for preparation of plan for providing the amenities including installation of sewers in the area to be served. The anticipated population, its density and its waste production is generally estimated for a specified planning period. The recommended planning period is 30 years.

Decadal growth of 7.67% is adopted for population projection, as the district average for the decade from 2001 to 2011 is 7.67%

| YEAR | POPULATION | INCREASE IN POPULATION | % INCREASE IN POPULATION |
|------|------------|---------------------------|-----------------------------|
| | | | |
| 2001 | 39608 | | |
| 2011 | 42646 | 3038 | 7.67% |

- Decimal increase 7.67%
- Current Year 2021
- Execution Period 2 Year
- Design Year 2053
- Design Period 30 Years

Accordingly, the population forecast of the municipality using the Geometrical increase method is shown in the table below:

| POPULATION FORCAST | | | | | | | | | |
|--------------------|--------------|------------------------|--------------------------|--------------------------|--------------------------|---------------------------------|--|--|--|
| Sl.No | WARD NO. | WARD NAME | POPULATION- YEAR 2011 | POPULATION- YEAR 2023 | POPULATIO N-YEAR 2038 | POPUL ATION- YEAR 2053 | | | |
| 1 | Ward No - 1 | vazhavara | 1170 | 1278 | 1428 | 1596 | | | |
| 2 | Ward No - 2 | Nirmala city | 1140 | 1246 | 1392 | 1555 | | | |
| 3 | Ward No - 3 | Society | 1166 | 1274 | 1423 | 1590 | | | |
| 4 | Ward No - 4 | Konginipadavu | 1129 | 1234 | 1378 | 1540 | | | |
| 5 | Ward No - 5 | Vellayamkudi | 1188 | 1298 | 1450 | 1620 | | | |
| 6 | Ward No - 6 | Vettikuzha kavala | 1376 | 1504 | 1680 | 1877 | | | |
| 7 | Ward No - 7 | Nathukallu | 1170 | 1278 | 1428 | 1596 | | | |
| 8 | Ward No - 8 | Kallukunnu | 1310 | 1431 | 1599 | 1787 | | | |
| 9 | Ward No - 9 | pezhumkavala | 1358 | 1484 | 1658 | 1852 | | | |
| 10 | Ward No - 10 | Valiyapara | 1303 | 1424 | 1591 | 1777 | | | |
| 11 | Ward No - 11 | Kochuthovala north | 1299 | 1419 | 1586 | 1772 | | | |
| 12 | Ward No - 12 | Kochuthovala | 1133 | 1238 | 1383 | 1545 | | | |
| 13 | Ward No - 13 | Aanakuthi | 1148 | 1254 | 1402 | 1566 | | | |
| 14 | Ward No - 14 | Parakadavu | 1240 | 1355 | 1514 | 1691 | | | |
| 15 | Ward No - 15 | puliyanmala | 1376 | 1504 | 1680 | 1877 | | | |
| 16 | Ward No - 16 | Ambalapara | 1376 | 1504 | 1680 | 1877 | | | |
| 17 | Ward No - 17 | Kattapana | 1184 | 1294 | 1445 | 1615 | | | |
| 18 | Ward No - 18 | Kunthalampara north | 1277 | 1395 | 1559 | 1742 | | | |
| 19 | Ward No - 19 | Kunthalampara south | 1299 | 1419 | 1586 | 1772 | | | |
| 20 | Ward No - 20 | Pallikavala | 1365 | 1492 | 1666 | 1862 | | | |
| 21 | Ward No - 21 | Erupathekkar | 1173 | 1282 | 1432 | 1600 | | | |
| 22 | Ward No - 22 | Ambalakavala | 1321 | 1443 | 1613 | 1802 | | | |
| 23 | Ward No - 23 | Mettukuzhi | 1373 | 1500 | 1676 | 1873 | | | |
| 24 | Ward No - 24 | Vallakadavu | 1172 | 1281 | 1431 | 1599 | | | |
| 25 | Ward No - 25 | Kadamakuzhi | 1161 | 1269 | 1417 | 1584 | | | |
| 26 | Ward No - 26 | Nariyampara | 1360 | 1486 | 1660 | 1855 | | | |
| 27 | Ward No - 27 | Thovarayar | 1205 | 1317 | 1471 | 1644 | | | |
| 28 | Ward No - 28 | ITI kunnu | 1373 | 1500 | 1676 | 1873 | | | |
| 29 | Ward No - 29 | Valiyakandam | 1354 | 1480 | 1653 | 1847 | | | |
| 30 | Ward No - 30 | Govt.college | 1299 | 1419 | 1586 | 1772 | | | |
| 31 | Ward No - 31 | suvarnagiri | 1177 | 1286 | 1437 | 1605 | | | |
| 32 | Ward No - 32 | kalyanathandu | 1232 | 1346 | 1504 | 1680 | | | |
| 33 | Ward No - 33 | Mulakaramedu | 1177 | 1286 | 1437 | 1605 | | | |
| 34 | Ward No - 34 | Kownthi | 1262 | 1379 | 1541 | 1721 | | | |
| | TOTAL | | 42646 | 46601 | 52064 | 58167 | | | |

Table 5.1: Population Forecast

Based on topography, population etc municipality is divided into two zones . Population for the zone 1 (sewerage network area) has been worked out and provided as per the projection the designed population is as follows.

| | SEWERAGE NETWORK AREA POPULATION | | | | | | | | | |
|--------------|----------------------------------|--------------------------|---------------------------------------|-------------------|-------------------------------|--|--|--|--|--|
| WARD NO. | WARD NAME | POPULATION- YEAR 2011 | PROJECTED POPULATION- YEAR 2053 | % COVERA GE | NETWORK AREA POPULATION | | | | | |
| Ward No - 8 | Kallukunnu | 1310 | 1787 | 40% | 715 | | | | | |
| Ward No - 9 | pezhumkavala | 1358 | 1852 | 5% | 93 | | | | | |
| Ward No - 13 | Aanakuthi | 1148 | 1566 | 50% | 783 | | | | | |
| Ward No - 17 | Kattapana | 1184 | 1615 | 100% | 1615 | | | | | |
| Ward No - 18 | Kunthalampara north | 1277 | 1742 | 5% | 87 | | | | | |
| Ward No - 19 | Kunthalampara south | 1299 | 1772 | 5% | 89 | | | | | |
| Ward No - 20 | Pallikavala | 1365 | 1862 | 100% | 1862 | | | | | |
| Ward No - 21 | Erupathekkar | 1173 | 1600 | 10% | 160 | | | | | |
| Ward No - 26 | Nariyampara | 1360 | 1855 | 10% | 185 | | | | | |
| Ward No - 27 | Thovarayar | 1205 | 1644 | 90% | 1479 | | | | | |
| Ward No - 28 | ITI kunnu | 1373 | 1873 | 90% | 1685 | | | | | |
| Ward No - 29 | Valiyakandam | 1354 | 1847 | 40% | 739 | | | | | |
| | Total | | | | 9491 | | | | | |

Table 5.2: Population Projection for network area

A septage zone (zone 2) is also proposed to areas where population density is less. In addition, in the high density populated areas but where there is no road network and low lying areas where connection to network is not possible, septage treatment is proposed. The Projected Population Capacity of Septage area is considered for the sewerage scheme is 48676.

5.2 SEWAGE LOAD

Sewerage load has been calculated based on the network area design population and water demand of 150 lpcd. Since some water is lost due to evaporation and seepage, only 80% of the average water supply is taken as sewage flow. Non domestic and floating water demand has been considered as 15% and infiltration as 10%. The Sewage load calculation in the network area is shown in the below table:

| NETWORK AREA - SEWAGE LOAD CALCULATION | |
|--|------|
| Network area population | 9491 |
| Water demand in year 2053 @150 lpcd | 1.42 |
| Non domestic and floating water demand 15% | 0.21 |
| Total Water demand in year 2053 | 1.64 |
| Seweage Load @80% | 1.31 |
| Add Infiltration 10% | 0.13 |
| Total Network area Sewage Load | 1.44 |

Table 5.3: Sewage Load Calculation for Network area

The sewage load in the septage area is calculated based on design population of septage area and the sludge deposit coefficient of 95 liters/head/year .The Septage load calculated for the proposal of co treatment with STP is 0.32 MLD.

Hence the total Sewage load treating in the STP with co treatment unit of septage is 1.76 MLD

5.3 COLLECTION SYSTEM

The collection system has been designed for ultimate year peak flow. The cumulative flows and the cumulative contributory population are discussed zone wise in the succeeding sections. The design diameter and slope have been finalized based on the minimum flow velocity of 0.60 m/s (present peak flow) with maximum velocity of 3.00 m/sec. The system has been designed using EPASWWM software. Design calculations are shown in Annexure attached. The sewerage system network has been so planned to limit lifting and pumping stations. The Maximum depth of the sewer lines are kept at 5.5 m from the existing ground level and in very minimal areas (3%) areas, it varies from 6-8m.

5.3.1 SEWERAGE NETWORK AND MANHOLES

The project network area is divided into 5 different subzones based on the natural flow directions, ridges etc. for routing. The main roads are identified and ground levels have been taken from the DGPS survey conducted in year 2021. The junction points and control points were cross-checked with field survey data with DGPS equipment. Social survey was done to ascertain the living conditions and amenities provided in the households. Reconnaissance survey was also carried out to assess the nature of buildings such as offices, institutions such as schools, colleges, hospitals, lodges, etc.

5.3.2 HYDRAULIC SIMULATION OF SEWAGE NETWORK

Hydraulic simulation of sewage network was performed after collection of all basic input data like sewage inflow at all points, expected routing plan for easy carriage of sewer load towards a common collection point and location of STP. A suitable peak factor to accommodate sewage flow variations are provided in the hydraulic analysis. The sewer flow is expected to be carried out in gravity conditions through a network of pipelines, manholes and lifting stations. The maximum depth of cutting is limited below 5.50 m and hence sewage lifting stations are provided making use of the manholes itself. For all pipelines minimum slopes to generate gravity flow is given as per the recommendations of CPHEEO Manual of Sewage Treatment Systems. For hydraulic simulation of the sewage network comprising of pipelines, manholes and lifting stations, US Environmental Protection Agencies' Storm Water Management Model (SWMM) is adopted considering its versatility in hydraulic modelling using dynamic flow routing conditions. US EPA's Storm Water Management Model (SWMM) is used throughout the world for planning, analysis, and design related to storm water runoff, combined and sanitary sewers, and other drainage systems.

The software EPASWMM was used to design the network owing to the fineness in the results. The EPA Storm Water Management Model (SWMM) is a dynamic rainfall-runoff simulation model used for single event or long-term (continuous) simulation of runoff quantity and quality from primarily urban areas. The runoff component of SWMM operates on a collection of sub catchment areas that receive precipitation and generate runoff and pollutant loads. The routing portion of SWMM transports this runoff through a system of pipes, channels, storage/treatment devices, pumps, and regulators. SWMM tracks the quantity and quality of runoff generated within each sub catchment, and the flow rate, flow depth, and quality of water in each pipe and channel during a simulation period comprised of multiple time steps. As the sewerage network system is designed by considering it as open channel flow, this software is the most apt for the design of sewer network. Moreover, we can visualize the output in a three dimensional platform and hence it can be refined to least error.

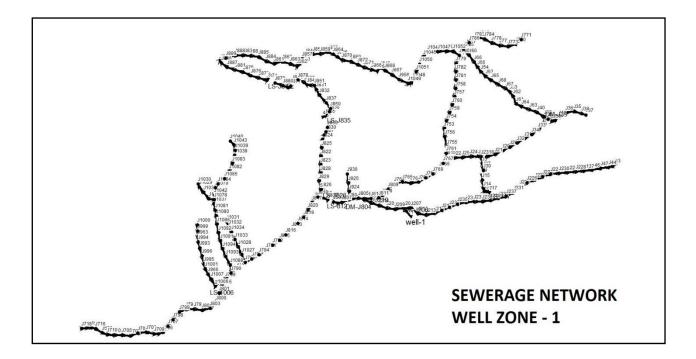
The manholes are first plotted in the scaled, geo referenced, auto cad base map. Using this auto cad base map prepared, a windows metafile format used as back drop in the EPASWMM window. The nodes representing manholes and links representing the conduits are plotted for developing the model in the EPASWMM software, consequently entered the parameters regarding the nodes and links. Based on the population scattered in the area especially taking into consideration, the point load from various non domestic buildings like hospitals, schools/colleges, lodges/hostels etc. located in the selected zone, the sewage load is assessed in each manhole and fed as dry weather flow in the model. The peak factor considered is 3. Flow routing is done correcting the invert levels of manholes by trial and error to the

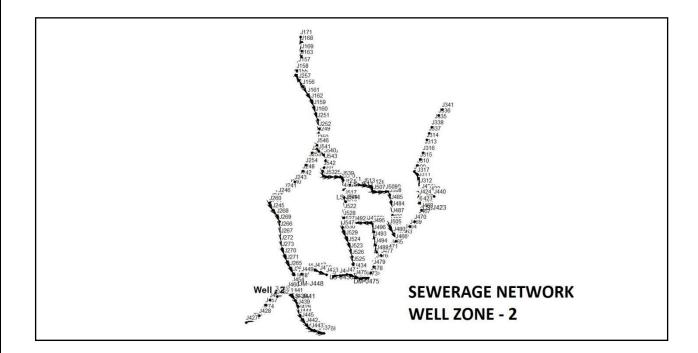
proposed outfalls. By several trials it was refined to successfully run with least error.

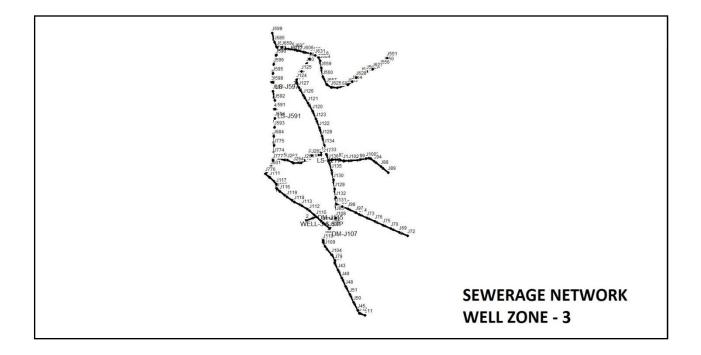
The detailed outputs of EPASWMM for five well zones are attached in Annexure-2.

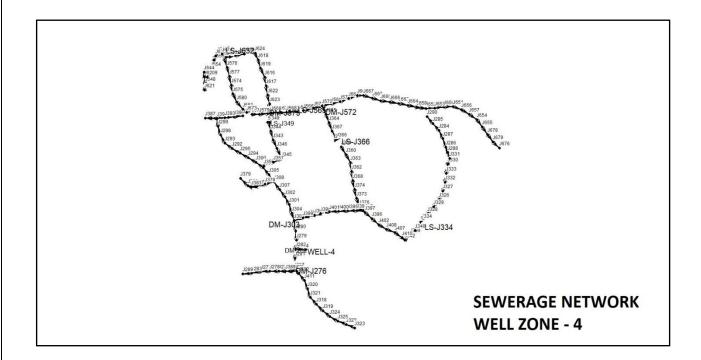
225mm HDPE-PE100, PN8 pipes for 27000m and 280mm HDPE-PE100, PN8 pipes for 406m are selected for the network for smooth functioning with little maintenance. The inverted level of manholes has been selected by providing the required slope for the movement of sewage with gravity.

The EPASWMM models of five well zones are as follows.









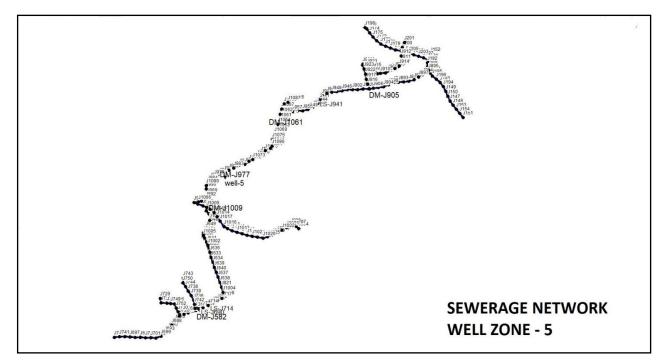


Figure 5.1 : Network Design output in EPASWMM

5.3.3 DETAILS OF SEWER NETWORK

| | NETWORK PIPE -SUMMARY | | | | | | | | |
|----------------------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------|--|--|
| Diameter mm (OD) | Type of Pipe | WELL ZONE 1- Length | WELL ZONE 2- Length | WELL ZONE 3- Length | WELL ZONE 4- Length | WELL ZONE 5- Length | TOTAL- Length(m) | | |
| | | | | | | | | | |
| | HDPE- | | | | | | | | |
| 225 mm | PE100,PN8 | 6980.97 | 4398.4 | 4757.66 | 5506.86 | 5356.11 | 27400.00 | | |
| 280 mm | HDPE- PE100,PN8 | 160.00 | | | 98.38 | 148.00 | 406.38 | | |
| | | | | | | | | | |
| TOTAL | | 7140.97 | 4398.4 | 4757.66 | 5605.24 | 5504.11 | 27406.38 | | |

Abstract of sewer network is furnished below:

Table 5.4: Network Length & Pipe details

5.3.4 MANHOLES

Total number of manholes comes to 1100.

| MANHOLE TYPE -SUMMARY | | | | | | | | | |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------|--|--|--|
| Diameter | WELL ZONE 1 | WELL ZONE 2 | WELL ZONE 3 | WELL ZONE 4 | WELL ZONE 5 | TOTAL | | | |
| | | | | | | | | | |
| 900mm | 204 | 130 | 137 | 135 | 144 | 750 | | | |
| 1200mm | 17 | 11 | 17 | 20 | 14 | 79 | | | |
| 1500mm | 72 | 50 | 39 | 57 | 53 | 271 | | | |
| TOTAL | 293 | 191 | 193 | 212 | 211 | 1100 | | | |

Table 5.5: Details of Manholes Type

| | MANHOLE DEPTH -SUMMARY | | | | | | | | | | |
|----------|------------------------|-------------|-------------|-------------|-------------|-------|--|--|--|--|--|
| Depth | WELL ZONE 1 | WELL ZONE 2 | WELL ZONE 3 | WELL ZONE 4 | WELL ZONE 5 | TOTAL | | | | | |
| | | | | | | | | | | | |
| upto1.5m | 177 | 108 | 122 | 121 | 116 | 644 | | | | | |
| 1.5-3m | 54 | 38 | 38 | 39 | 47 | 216 | | | | | |
| 3-4.5m | 39 | 24 | 25 | 25 | 28 | 141 | | | | | |
| 4.5-6m | 23 | 21 | 8 | 27 | 20 | 99 | | | | | |
| TOTAL | 293 | 191 | 193 | 212 | 211 | 1100 | | | | | |

Table 5.6: Details of Manhole Depth

5.4 PUMPING STATION AND RISING MAIN

Pumping or force mains deliver wastewater discharged from a pumping station to its destination, which may be a treatment plant or the final disposal point.

5.4.1 LIFTING STATION /PUMPING STATION

Pump stations are normally required in a sewage collection system to lift the sewage against a gradient or to limit the depth of cutting of the pertinent sewer line. A simplified form of the pump station, called a

Lift Station, is also employed for the same purpose. The primary difference between a pump station and a lift station is that the Pump Station shall handle greater flows with arrangements for removal of floating material and grit prior to pumping through a force main. Lift Stations will have only an enlarged manhole as a wet well with pumps installed and a small control room adjacent to it, for lifting the sewage to ground level. Lift stations are generally used to restrict the depth of cutting and discharging normally to the manhole in a downstream trunk sewer. No screens and grit wells are provided in lift stations. Pumping and lifting stations shall use submersible pumps, such stations have a single well, circular or rectangular, in which pumps are installed. Superstructure requirement is minimum. The pump stations have been designed considering easy removal and reinstallation of the pumps without disturbing the connecting delivery pipe work.

Hydraulic Criteria: According to the existing ground level contour from the topographic survey, the number of pumping stations has been finalized. Lift stations are generally proposed where depth of cutting exceeds 5.5 m except at certain stretches (3%) goes upto 8m. The location of pumping stations is at lower points of the network, but away from public and flood areas. Overflow is not allowed.

5.4.2 DETAILS OF COLLECTION WELL/PUMPING STATIONS

In the project there are 5 Nos. of collection wells proposed. Out of this five collection wells, well 3 is located in the premises of STP site at Housing Board plot (Sy.No. no.39/4,6-9) near Bypass road. Well 1 is located near SH Convent, (Sy.No.305) Pallikavala-vallakadavu road and Well 2 is located opposite of St.Martha Convent, (Sy.No.43) By pass road. Well 4 is located opposite of Govt. Vetenary hospital, (Sy.No.48) Kunthalampara road and Well 5 is located after thovarayar post office in, Thovarayar road.

| | COLLECTION WELL/PUMPING STATIONS | | | | | | | | | |
|--|--|----------------------------|------------------------|----------------------------|-----------------------------|--|--|--|--|--|
| COLLECTION WELL/PUMPING STATIONS | LOCATION | LAND REQUIRED | PEAK FLOW IN LPS | DIAMETER OF WELL (M) | TOTAL DEPTH IN METERS | | | | | |
| well-1 | near SH Convent(Near block office ,bypass road) | 6 Cents | 18.71 | 6.2 | 6.65 | | | | | |
| well-2 | near St.Martha Convent(pallikavala vallakadavu road) | 6 Cents | 6.8 | 4.6 | 5.15 | | | | | |
| well-3 | STP plot –Housing board land | 100 Cents including STP | 7.12 | 4.6 | 5.75 | | | | | |
| well-4 | Near sub treasury | 6 Cents | 7.73 | 6 | 6.76 | | | | | |
| well-5 | Near samskarika nilayam(Thovarayar post office) | 6 Cents | 9.67 | 7 | 9.53 | | | | | |

Table 5.7: Details of Collection well



Figure 5.2: Proposed STP site -Housing board plot



Figure 5.3: Proposed Well sites W1 &W2

5.4.3 DETAILS OF LIFTING STATIONS

| WELL ZONE | NO | LS(nodes) | SWD | PEAK | Diameter (OD) | Material |
|-----------|------|------------|------|---------|---------------|------------------|
| | | | in m | FLOW IN | pipe in mm | |
| | | | | LPS | | |
| WELL-1 | LS1 | J1006-J801 | 1 | 0.576 | 90 | HDPE-PE100 PN 10 |
| | LS2 | J826-J610 | 1 | 3.648 | 90 | HDPE-PE100 PN 10 |
| | LS3 | J812-J806 | 1 | 8.4 | 90 | HDPE-PE100 PN 10 |
| | LS4 | J835-J836 | 1 | 3.168 | 90 | HDPE-PE100 PN 10 |
| | LS5 | J874-J879 | 1 | 2.304 | 90 | HDPE-PE100 PN 10 |
| | LS6 | J17-J239 | 1 | 3.168 | 110 | HDPE-PE100 PN 10 |
| | | | | | | |
| WELL-2 | LS7 | J441-J460 | 1 | 0.72 | 90 | HDPE-PE100 PN 10 |
| | LS8 | J450-J453 | 1 | 5.4 | 90 | HDPE-PE100 PN 10 |
| | LS9 | J514-J517 | 1 | 1.824 | 90 | HDPE-PE100 PN 10 |
| | LS10 | J511-J515 | 1 | 0.864 | 90 | HDPE-PE100 PN 10 |
| | LS11 | J423-J419 | 1 | 1.056 | 90 | HDPE-PE100 PN 10 |
| | | | | | | |
| WELL-3 | LS12 | J598-J597 | 1 | 1.488 | 90 | HDPE-PE100 PN 10 |
| | LS13 | J591-J594 | 1 | 1.68 | 90 | HDPE-PE100 PN 10 |
| | LS14 | J217-J133 | 1 | 0.624 | 90 | HDPE-PE100 PN 10 |
| | LS15 | J286-J285 | 1 | 0.768 | 90 | HDPE-PE100 PN 10 |
| | LS16 | J289-J296 | 1 | 1.488 | 90 | HDPE-PE100 PN 10 |

| | 1 | | | | | |
|--------|------|-----------|---|-------|----|------------------|
| | | | | | | |
| WELL-4 | LS17 | J349-J573 | 1 | 0.384 | 90 | HDPE-PE100 PN 10 |
| | LS18 | J565-J566 | 1 | 2.16 | 90 | HDPE-PE100 PN 10 |
| | LS19 | J366-J361 | 1 | 4.086 | 90 | HDPE-PE100 PN 10 |
| | LS20 | J334-J340 | 1 | 0.768 | 90 | HDPE-PE100 PN 10 |
| | LS21 | J207-J206 | 1 | 0.144 | 90 | HDPE-PE100 PN 10 |
| | | | | | | |
| WELL-5 | LS22 | J690-J713 | 1 | 1.806 | 90 | HDPE-PE100 PN 10 |
| | LS23 | J714-J711 | 1 | 1.899 | 90 | HDPE-PE100 PN 10 |
| | LS24 | J941-J944 | 1 | 4.758 | 90 | HDPE-PE100 PN 10 |

Table 5.8: Details of Lifting station

5.5 PUMPING MAINS

The pumping main carries sewage from collection well to STP under pressure. From each collection well, separate pumping main is designed to carry sewage to the treatment plant.

The schematic diagram of Pumping main is shown below:

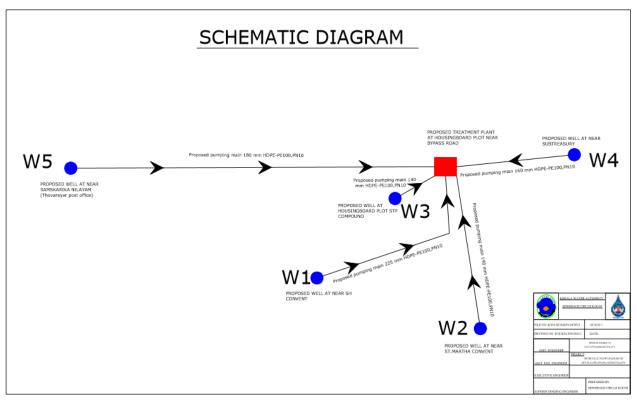
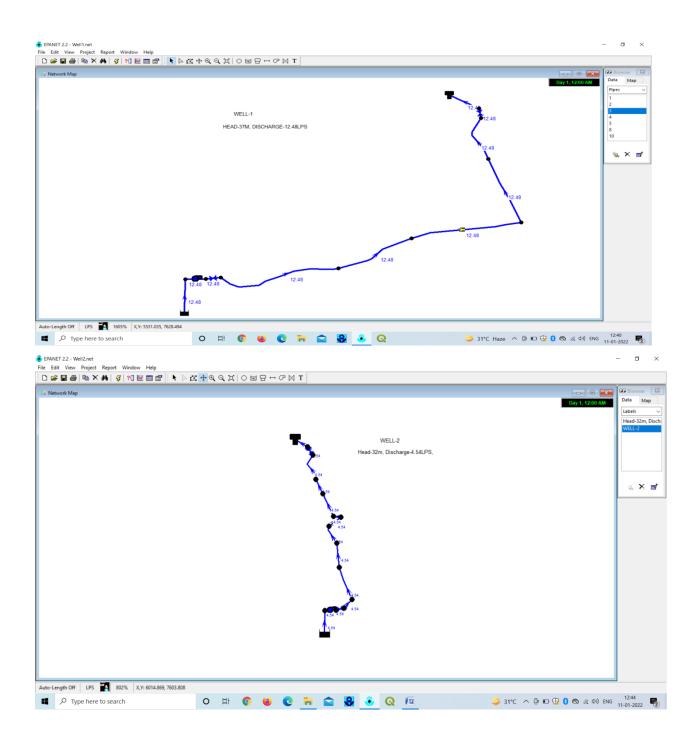
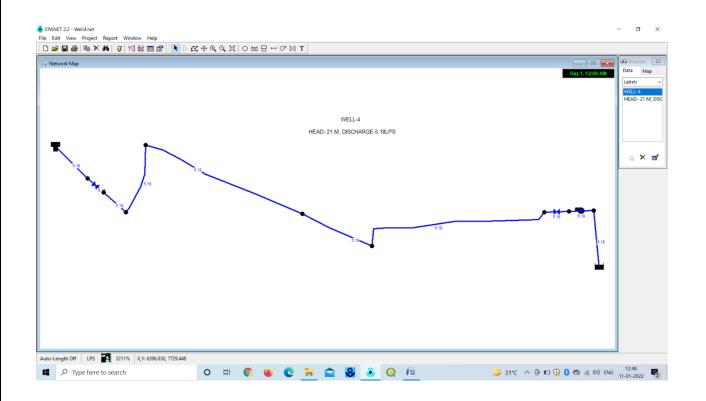


Figure 5.4 : Schematic diagram of Pumping Main

The EPANET model of five pumping main is as shown below.



EPANET 2.2 - Well3.inp File Edit View Project Report Window Help ٥ × □ ☞ ■ ● № × ₩ | ダ | % ፼ ■ ☞ | ▶ ☆ ⊕ Q Q 其 | ○ ㅂ 묘 ㅂ ౮ ⋈ T | • 99 wk Ma Data WELL-3 HEAD-21.50M, D WELL-3 HEAD-21.50M, DISCHARGE-4.74LPS a 🗙 🖬 4.74 Auto-Length Off LPS 🛃 200% X,Y: -880.479, 6846.652 31°C ^ D D D 0 0 (6 40) ENG 12:54 11-01-2022 Type here to search o H O 🗉 C 🐂 🕿 🚱 💽 🦉



DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana

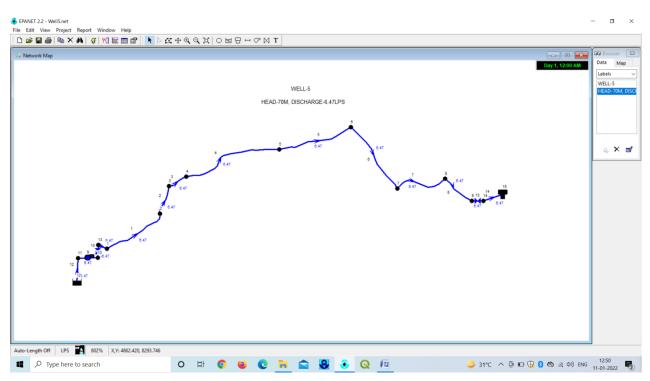


Figure 5.5 : Design of Pumping mains (5 Nos.) in EPANET

| PUMPING MAIN DETAILS | | | | | | | | | |
|----------------------|------------|----------------|-----------------|--|--|--|--|--|--|
| DESCRIPTION | LENGTH (M) | DIAMETER(OD)mm | MATERIAL | | | | | | |
| WELL 1 to STP | 1154 | 225 | HDPE-PE100,PN10 | | | | | | |
| WELL 2 to STP | 1104 | 140 | HDPE-PE100,PN10 | | | | | | |
| WELL 3 to STP | 50 | 140 | HDPE-PE100,PN10 | | | | | | |
| WELL 4 to STP | 763 | 160 | HDPE-PE100,PN10 | | | | | | |
| WELL 5 to STP | 2410 | 180 | HDPE-PE100,PN10 | | | | | | |

Table 5.9: Pumping main details

5.6 PUMP AND OPERATION CONTROL

Fluid level activated switches will be provided to start and to stop the pumps depending upon the quantity of sewage available in the pump house. This will ensure that the pumps will not run dry. A sluice valve will be provided on the suction side and a sluice valve and a non return valve will be provided on the delivery side. Flow meter (digital type) will be provided to measure the quantity of sewage flowing out of the pumping station. It will be an integrating type indicating instantaneous flow and the cumulative flow.

5.6.1 DETAILS OF PUMP SETS

| DETAILS OF PUMP SET | | | | | | | | | | |
|---------------------|-------------------|---------------------------------------|-----|--------------|--|--|--|--|--|--|
| Sl.No | Name | No. of Pump Set (Incl.One Standby) | НР | Type of Pump | | | | | | |
| 1 | LS-1,7,9-17,20-23 | 2 | 0.5 | Submersible | | | | | | |
| 2 | LS -2,4,5,18,19 | 2 | 1 | Submersible | | | | | | |
| 3 | LS-8,24 | 2 | 1.5 | Submersible | | | | | | |
| 4 | LS-3,6 | 2 | 2 | Submersible | | | | | | |
| 3 | WELL 1 to STP | 2 | 15 | Submersible | | | | | | |
| 4 | WELL 2 to STP | 2 | 5 | Submersible | | | | | | |
| 5 | WELL 3 to STP | 2 | 5 | Submersible | | | | | | |
| 6 | WELL 4 to STP | 2 | 5 | Submersible | | | | | | |
| 7 | WELL 5 to STP | 2 | 15 | Submersible | | | | | | |

Table 5.10: Pump set details

5.7 ARRANGEMENTS FOR POWER SUPPLY

KSEB will supply power at 11/22KV HT supply or 440 V LT supply for the operation of pumps in the pumping stations and for operation of equipment in the STP. In respect of HT supply, suitable transformers would be provided to step down the voltages to 440V. In case the Horse Power of pump set is less than 75HP, 440V LT supply will be availed. Each pumping station shall have Motor control centre for start-stop and other controls for protection and safety of motors and other auxiliary equipment. Capacitors of suitable capacity would be provided to improve the power factor, so that power consumption can be brought down.

CHAPTER - 6

TECHNOLOGY OPTION FOR STP

6.1 SEWAGE TREATMENT

Sewage treatment is a type of wastewater treatment which aims to remove contaminants from sewage to produce an effluent that is suitable for discharge to the surrounding environment or an intended reuse application, thereby preventing water pollution from raw sewage discharges. Sewage contains wastewater from households and businesses and possibly pre-treated industrial wastewater. There is a high number of sewage treatment processes to choose from. These can range from decentralized systems (including on-site treatment systems) to large centralized systems involving a network of pipes and pump stations which convey the sewage to a treatment plant.

Sewage is a type of wastewater that is produced by a community of people. It is typically transported through a sewer system. Sewage consists of wastewater discharged from residences and from commercial, institutional and public facilities that exist in the locality. Sub-types of sewage are greywater (from sinks, bathtubs, showers, dishwashers, and clothes washers) and blackwater (the water used to flush toilets, combined with the human waste that it flushes away). Sewage also contains soaps and detergents. Food waste may be present from dishwashing. Sewage may contain micro-pollutants and pollutants from industrial wastewater.

The main parameters in sewage that are measured to assess the sewage strength or quality as well as treatment options include: solids, indicators of organic matter, nitrogen, phosphorus, and indicators of fecal contamination. The following four types of pathogens from fecal matter are found in sewage: bacteria, viruses, protozoa, helminths and their eggs. In order to quantify the organic matter, indirect methods are commonly used: mainly the Biochemical Oxygen Demand (BOD) and the Chemical Oxygen Demand (COD). Typical values for physical–chemical characteristics of raw sewage in developing countries have been published as follows: 180 g/person/d for total solids (1100 mg/L concentration), 50 g/person/d for BOD (300 mg/L), 100 g/person/d for COD (600 mg/L), 8 g/person/d for total nitrogen (45 mg/L), 4.5 g/person/d for ammonia-N (25 mg/L) and 1.0 g/person/d for total phosphorus (7 mg/L).

Sewage can be treated close to where the sewage is created, which may be called a "decentralized" system or even an "on-site" system (on-site sewage facility, septic tanks, etc.). Alternatively, sewage can be collected and transported by a network of pipes and pump stations to a municipal treatment plant. This is called a "centralized" system. The procedure for removing contaminants from the wastewater basically from the household sewage is called sewage treatment. It has to undergo the chemical, physical and biological procedure to remove these contaminants and give out an environmentally safe treated effluent.

Choosing the most suitable treatment process is complicated and requires expert inputs, often in the form of feasibility studies. This is because the main important factors to be considered when evaluating and selecting sewage treatment processes are numerous: process applicability, applicable flow, acceptable flow variation, influent characteristics, inhibiting or refractory compounds, climatic aspects, process kinetics and reactor hydraulics, performance, treatment residuals, sludge processing, environmental constraints, chemical product requirements, energy requirements, requirements of other resources, personnel requirements, operating and maintenance requirements, ancillary processes, reliability, complexity, compatibility, area availability. With regards to environmental impacts the following aspects are included in the selection process: Odors, vector attraction, sludge transportation, sanitary risks, air contamination, soil and subsoil contamination, surface water pollution or groundwater contamination, devaluation of nearby areas, inconvenience to the nearby population.

The different stages of the treatment process involved for the treatment of sewage is shown in the flow diagram.

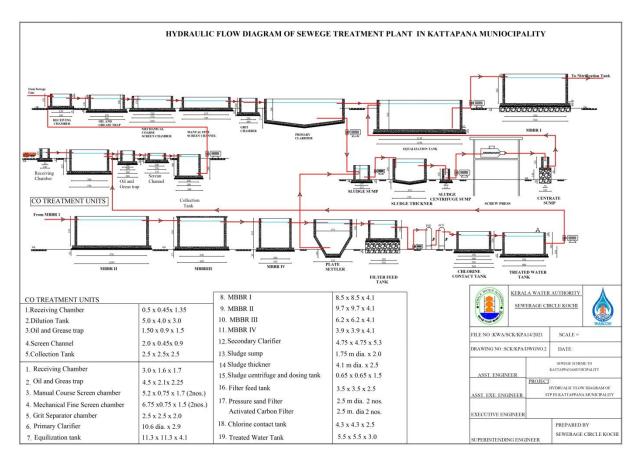


Figure-6.1 Hydraulic Flow Diagram

6.2 TREATMENT UNITS

6.2.1 PRE-TREATMENT

Pre-treatment removes all materials that can be easily collected from the raw sewage before they damage or clog the pumps and sewage lines of treatment. Objects commonly removed during pretreatment include trash, tree limbs, and other large objects. The influent in sewage water passes through a bar screen to remove all large objects like cans, rags, sticks, plastic packets, etc. carried in the sewage stream. This is most commonly done with an automated mechanically raked bar screen in modern plants serving large populations, while in smaller or less modern plants, a manually cleaned screen may be used. The raking action of a mechanical bar screen is typically paced according to the accumulation on the bar screens and/or flow rate. The solids are collected and later disposed of in a landfill, or incinerated.

6.2.1.1 GRIT REMOVAL

Grit consists of sand, gravel, cinders, and other heavy materials. Pretreatment may include a sand or grit channel or chamber, where the velocity of the incoming sewage is adjusted to allow the settlement of sand and grit. Grit removal is necessary to

- Reduce formation of heavy deposits in aeration tanks, aerobic digesters, pipelines, channels, and conduits
- Reduce the frequency of digester cleaning caused by excessive accumulations of grit and
- Protect moving mechanical equipment from abrasion and accompanying abnormal wear.

The removal of grit is essential for equipment with closely machined metal surfaces such as comminutors, fine screens, centrifuges, heat exchangers, and high pressure diaphragm pumps. Grit chambers come in 3 types: horizontal grit chambers, aerated grit chambers, and vortex grit chambers. Sand and other particles of specific gravity > 2.65 are settled in the Grit Chamber. Grit removal systems have been designed to remove clean inorganic particles that are greater than 0.210 millimetres, most grit passes through the grit removal flows under normal conditions. During periods of high flow deposited grit is re suspended and the quantity of grit reaching the treatment plant increases substantially. It is, therefore, important that the grit removal system not only operate efficiently during normal flow conditions but also under sustained peak flows when the greatest volume of grit reaches the plant.

6.2.1.2 PARSHALL FLUME

The Parshall flume is an open channel flow metering device that was developed to measure the flow. It is used to measure volumetric flow rate in municipal sewer lines, and influent/effluent flows in wastewater treatment plants. In Parshall flume flow should be measured at a point that is 2/3 the length of the converging wall measured back from the throat. It is important to note that this distance is not simply 2/3 of the distance back from the throat, but it is 2/3 of the length of the side wall. The advantages of the Parshall flume are

- It passes sediment and small trash easily
- It requires only a small head loss, and
- It allows accurate flow measurements even when partially submerged.

A disadvantage of the Parshall flume is that it is not accurate at low flow rates.

6.2.2 EQUALIZATION TANK

Flow equalization is used to minimize the variability of water and wastewater flow rates and composition. The main function of the equalization tank is to act as a buffer: to collect the raw incoming sewage that comes at widely fluctuating rates and pass it on to the rest of the sewage treatment plant at a steady flow rate. The tank is rectangular in shape to provide placement of air diffusers for full floor coverage. Each unit operation in a treatment train is designed for specific wastewater characteristics. Improved efficiency and control are possible when all unit operations are carried out at uniform flow conditions. The equalization tanks are provided (i) to balance fluctuating flows or concentrations, (ii) to assist self-neutralization, or (iii) to even out the effect of a periodic "slug" discharge from a batch process. In STP design equalization tank is provided to enable the source to operate at a predetermined rate. Waste water generated does not flow at a constant rate. Even in dry weather, the flow rate varies from hour to hour. Flow equalization is a process of controlling flow velocity and flow composition. It is necessary in many municipal treatment processes to dampen severe variation in inflow and water quality. Providing consistent flow and loading to a biological process is important to maintain optimal treatment. The principal factors considered in the design of equalization tanks are

- Location and configuration,
- Volume
- Tanks geometry,
- Mixing and air requirements,
- Appurtenances (accessories, trappings) and
- Pumping facilities

Considering the variation in hourly flow pattern adopted as shown in appendix, volume of equalization tank is arrived at around 456 m3. Thus in order to maintain uniform flow rate the retention time is considered as 6.2 hrs. Due to the additional retention time, aeration and mixing is required to prevent the raw wastewater from becoming septic and to maintain solids in suspension. Homogeneous mixture in Equalization Tank is done via the actions of coarse bubble diffusers , oxygen transfer efficiency of a coarse bubble diffuser is 10%-20% and are capable of delivering 6 - 12 m3 / hour air , typical diameter of coarse bubble diffuser is 150 mm and other role is to make water homogeneous in nature.

6.2.3 SECONDARY TREATMENT

Secondary treatment removes the soluble organic matter that escapes primary treatment. It also removes more of the suspended solids. Removal is usually accomplished by biological processes in which microbes consume the organic impurities as food, converting them into carbon dioxide, water, and energy. MBBR has been proposed as a secondary treatment option due to the following reasons.

- 1. MBBR has been in existence sufficiently for a long time, also in India and is a proven technology.
- 2. Minimum footprint
- 3. Better stabilized sludge
- 4. Better Effluent Quality
- 5. Less sophisticated
- 6. Spare parts available
- 7. Lower life cycle cost
- 8. Nil odour nuisance and other environmental hazards

The MBBR process is an attached growth biological wastewater treatment process. That is, the microorganisms that carry out the treatment are attached to a solid medium, as in trickling filters or RBC systems. The microorganisms that carry out the treatment are kept suspended in the mixed liquor in the aeration tank.

6.2.3.1 MOVING BED BIO REACTOR (MBBR) TECHNOLOGY

MBBR technology employs thousands of polyethylene biofilm carriers operating in mixed motion within an aerated wastewater treatment basin. Each individual bio- carrier increases productivity through providing protected surface area to support the growth of heterotrophic and autotrophic bacteria within its cells. It is this high-density population of bacteria that achieves high-rate biodegradation within the system, while also offering process reliability and ease of operation.

This technology provides cost-effective treatment with minimal maintenance since MBBR processes selfmaintain an optimum level of productive biofilm.

Additionally, the biofilm attached to the mobile bio carriers within the system automatically responds to load fluctuations.

6.2.3.2 PROCESS BENEFITS

- Compact Design: A fraction of the size of conventional systems
- Expandable: Capacity can be easily upgraded by simply increasing the fill fraction of biofilm carriers
- Single Pass Process: No return activated sludge stream required
- Load Responsive: Actively sloughed biofilm automatically responds to load fluctuations
- Minimal Maintenance

No F/M ratios or MLSS levels to maintain MBBR processes are an excellent solution for common wastewater applications including

- BOD Reduction
- Nitrification
- Total Nitrogen Removal

Moving Bed Biofilm Reactor systems deliver a flexible, cost-effective, and easy- to-operate means to address current wastewater requirements and the expandability to meet future loads or more stringent discharge requirements within a compact design.

6.2.3.3 FEATURES OF MBBR

In Fluidized aerobic process a non-clogging biofilm reactor with special grade plastic media having density close to that of water is used. This plastic media has more surface area and biofilm grows on these media which move along with the water in the reactor. This movement within the reactor is generated by providing aeration with the help of diffusers placed at the bottom of the aerobic reactor. The thin biofilm on the elements enables the bacteria to act upon the biodegradable matter in sewage and reduce BOD /

COD content in the presence of oxygen present in air. Area requirement for this process is 1/10 of space required for conventional sewage treatment plants. Power requirements are low as recycling of sludge is not done in this method as required in ASP. This can take shock loads and can withstand variation. Expected COD/BOD removal is more than 95%.

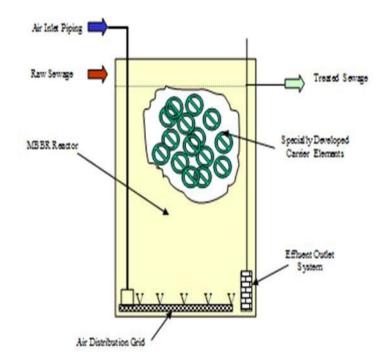
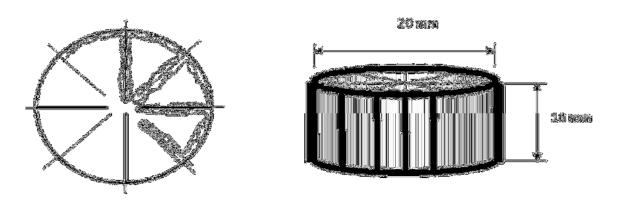


Fig 6.2: Essential Components of MBBR





6.2.3.4 MBBR WASTEWATER TREATMENT PROCESS ALTERNATIVES

The MBBR wastewater treatment process is quite flexible and can be used in several different ways. The figure shows the flow diagram of the options adopted for the proposed treatment plant, with single stage BOD removal, nitrification, post anoxic denitrification with raw sewage feeding for carbon source and thereafter removing low grade BOD in the subsequent reactor.

6.2.3.5 POST ANOXIC DENITRIFICATION ALTERNATIVE

In order to carry out the denitrification of the waste water flow (removal of the Nitrogen from the waste water), it is necessary to first nitrify the waste water, conversion of ammonia nitrogen typically present in the influent wastewater to nitrate. Nitrification will only take place at a reasonable rate in the MBBR reactor if the BOD level is quite low, thus an MBBR denitrification process will need a reactor for BOD removal, one for nitrification and one for denitrification. Nitrification reactor will always follow the BOD removal reactor because of the need for low BOD level in the nitrification reactor. Denitrification reactor is provided after the nitrification reactor as the post anoxic denitrification.

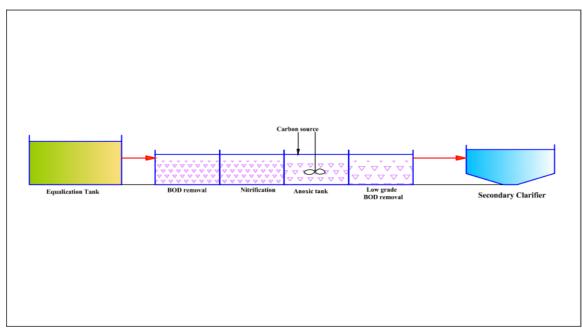


Figure 6.4 Nitrification and Denitrification Reactors

6.2.3.6 NITRIFICATION TANK

Ammonia in wastewater could originate from a variety of sources, including Proteins (meat and blood), urea, amino acid products, casein, corrosion inhibitors, process chemicals and raw materials or cleaning chemicals containing quaternary ammonium compounds. Nitrification is a bio-chemical reaction that occurs inside bacteria. Two species of bacteria are involved in the process – Nitrosomonas and Nitrobacter.

These bacteria are collectively known as nitrifiers and are autotrophic, i.e. they get their carbon source from inorganic carbon (carbonates, bicarbonates) or carbon dioxide.

A healthy and stable population of nitrifiers (Nitrosomonas and Nitrobacter) will not exist without the following conditions:

- OXYGEN: Nitrifiers are obligate aerobes, i.e. they require free molecular oxygen and are killed off by anaerobic conditions. Maximum nitrification occurs at a D.O. (Dissolved Oxygen) level of 3.0 mg/l. Significant nitrification occurs at a D.O. level of 2.0 to 2.9 mg/l. Nitrification ceases at D.O. levels of <0.5 mg/l. Approximately 4.6 kg of oxygen are required for every kg of ammonium ions oxidized to nitrate (This compares with a requirement of 1 kg of oxygen to oxidize 1 kg of carbonaceous B.O.D.). An absence of oxygen for <4 hours does not adversely affect nitrifiers when oxygen is restored. To ensure effective nitrification, always maintain a D.O. level of 1.5 mg/l.
- TEMPERATURE: Nitrification is temperature sensitive. The optimum temperature for nitrification is generally considered to be 30°C.

| >45°C | Nitrification ceases |
|---------|---|
| 28-32°C | Optimal temperature range |
| 16°C | Approx. 50% of nitrification rate at 30°C |
| 10°C | Significant reduction in nitrification rate -20% of rate at 30°C |
| <5°C | Nitrification ceases |

• ALKALINITY AND pH: Alkalinity is lost in an activated sludge process during nitrification. Nitrifiers use alkalinity as a carbon source, i.e., they use an inorganic form of carbon. Hydrogen ions (H+) are produced when ammonium ions are oxidized to nitrite:

 $NH_4^{++} + 1.5O_2$ $2H^+ + NO_2^- + 2H_2O_2$.

Nitrous acid (HNO2) is also produced during the oxidation of ammonium ions. This destroys alkalinity:

$$H^+ + NO_2^-$$
 HNO_2^-

7.14 mg of alkalinity as CaCO3 are destroyed for every mg of ammonium ions oxidized. If the pH drops below 6.7, there is a significant decrease in nitrification. Therefore, it is important to maintain an adequate alkalinity in the aeration tank to provide pH stability and also to provide inorganic carbon for nitrifiers. After complete nitrification, a residual alkalinity of 50 mg/l in the aeration tank is desirable. If this alkalinity is not present, then alkalinity should be added to the aeration tank. The optimal pH range for nitrification is 7.2 to 8.0. A substantial reduction in nitrification activity occurs at pH levels below 6.7.

• HIGH MEAN CELL RESIDENCE TIME (SLUDGE AREA) OR LOW F:M:

The necessary MCRT or F: M values are temperature dependent. Nitrifier activity and reproduction are decreased during cold temperatures. Therefore, in winter, an increase in the quantity of nitrifiers (MLVSS) or an increase in MCRT is often required to maintain effective nitrification. Reducing the wasting rate (WAS rate) will increase the MCRT.

INHIBITION/TOXICITY:

Inhibition is temporary short-term or long-term loss of enzymatic activity. Toxicity is permanent loss of enzymatic activity or irreversible damage to cellular structure. Small increases in inhibitory wastes can cause a dramatic reduction in nitrification. Nitrifiers grow slowly and only account for a small portion of the bacterial assemblage in an aeration system. Nitrifiers are excellent indicators of toxic shock in an effluent treatment plant. Significant loss of nitrification will occur before loss in efficiency of carbonaceous BOD removal. Nitrifying bacteria are also inhibited by relatively low concentrations of free ammonia (10 mg/l for Nitrosomonas; 0.1 mg/l for Nitrobacter) and free nitrous acid (1.0 mg/l for both Nitrosomonas and Nitrobacter). Free ammonia (NH3) is produced from ammonium ions under a high pH in the aeration tank. Free nitrous acid (NHO2) is produced from nitrite ions under a low pH in the aeration tank. This type of inhibition is known as substrate inhibition. Substrate inhibition usually occurs

at a concentration of 400-500 mg/l ammonium ions or when ammonium ions are converted to nitrite ions at a faster rate than nitrite ions are converted to nitrate ions.

BOD: Soluble and simplistic forms of cBOD can inhibit the activity of nitrifying bacteria. They are able to enter the cells of nitrifying bacteria and inactivate their enzyme systems. This form of cBOD must be degraded significantly or completely by organotrophs in order for nitrifying bacteria to oxidize ammonium and nitrite ions. Nitrifiers are dependent on organotrophs to reduce cBOD to relatively low concentrations (<40-50 mg/l). Excess BOD can cause a significant oxygen demand, which may cause a drop in D.O. that adversely affects nitrifying bacteria. Fluctuations in BOD loading may lead to intermittent nitrification.

6.2.3.7 DENITRIFICATION PROCESS IN THE REACTOR

Denitrification is the process that converts nitrate to nitrogen gas, thus removing bioavailable nitrogen and returning it to the atmosphere. Unlike nitrification, denitrification is an anaerobic process, occurring mostly in soils and sediments and anoxic zones in lakes and oceans. In a biological water treatment, denitrification is generally the next step following nitrification. Here nitrate (NO3) and nitrite (NO2) are transformed into nitrogen (N2). The gaseous nitrogen escapes out of the water into the air. Air exists for 78% out of nitrogen (N2) and for 21% out of O2 (oxygen), so N2 is absolutely not polluting the atmosphere. A large number of aerobic bacteria is able to perform denitrification. When there is no oxygen in the water, these bacteria use nitrate and nitrite as a source of oxygen.

The denitrification reaction requires a carbon source. Hence raw sewage is proposed to dose from the equalization tank to the denitrification tank and BOD in the primary effluent waste water is used as the carbon source for the denitrification. Thereafter a reactor is also proposed for dealing low grade BOD in the effluent.

6.2.3.8 SECONDARY CLARIFIER

Secondary clarifiers are to separate biological floc from the treated liquid waste stream. Plate settlers are also being proposed in the clarifier to get more clarified water. Clarifiers are settling tanks built with mechanical means for continuous removal of solids being deposited by sedimentation. A clarifier is generally used to remove solid particulates or suspended solids from liquid for clarification. Necessary coagulants are being added before feeding the clarifier.

6.2.4 CLARIFIED WATER COLLECTION TANK

After treatment, the effluent is stored in this tank from where it is taken for further treatment.

6.2.5 SLUDGE COLLECTION SUMP

The dead bacteria that die after consuming BOD and COD are retained in the form of sludge from the bottom of the tank.

6.2.6 DEWATERING UNIT

A dewatering unit is required to further dry the sludge. The centrate at the outlet of the dewatering unit is then re circulated to the system.

6.2.7 TERTIARY TREATMENT

Tertiary treatment refers to secondary treatment followed by a filtration step, such as media filtration, so that the turbidity and TOC concentrations are generally lower, and if coagulation with metal salts is used, then the phosphate concentration will also be reduced.

6.2.7.1 PRESSURE SAND FILTER (PSF)

The treated water which is collected in the filter feed tank shall be pumped into the Pressure Sand Filter using the Filter Feed Pumps. They are the most popular method for removal of turbidity from water. The Pressure Sand Filter consists of a multiple layer of sand with a variety in size and specific gravity. These Filters are designed to remove turbidity and suspended particles present in the feed water with minimum pressure drop. Raw water flows downwards through the filter bed and as the suspended matter, which is treated by addition of a coagulant like alum or poly electrolyte, is retained on the sand surface and between the sand grains immediately below the surface. There is steady rise in the loss of head over a period of time and the flow reduces once the pressure drop across the filter is excessive. The filter is then taken out of service and cleaning of the filter media is affected by flow reversal also called as backwash. To assist in cleaning the bed, the backwash operation is sometimes preceded by air scouring by way of agitation through the under drain system. The air scouring agitates the sand with a scrubbing action, which loosens the intercepted particles.



Fig 6.5 Pressure Sand Filter

Kerala Water Authority, Sewerage Circle, Kochi

6.2.7.2 ACTIVATED CARBON FILTER (ACF)

Filtered wastewater from Pressure sand filter is then passed through the Activated Carbon Filter. They are generally employed in the process of removing organic compounds and/or extracting free chlorine from water, thereby making the water suitable for discharge.

Activated carbon is commonly used for removing organic constituents and residual disinfectants in water supplies. This not only improves taste and minimizes health hazards; it protects other water treatment units such as reverse osmosis membranes and ion exchange resins from possible damage due to oxidation or organic fouling. Activated carbon is a favoured water treatment technique because of its multifunctional nature and the fact that it adds nothing detrimental to the treated water. Most activated carbons are made from raw materials such as nutshells, wood, coal and petroleum.

Carbon filtering is a method of filtering that uses a bed of activated carbon to remove contaminants and impurities, using chemical adsorption. Each particle/granule of carbon provides a large surface area/pore structure, allowing contaminants the maximum possible exposure to the active sites within the filter media.



Fig 6.6 Activated Carbon Filter

6.2.7.3 CHLORINE CONTACT TANK

Chlorination is by far the most common method of wastewater disinfection and is used worldwide for the disinfection of pathogens before discharge into receiving streams, rivers or oceans. Chlorine is known to be effective in destroying a variety of bacteria, viruses and protozoa, including Salmonella, Shigella and

Vibrio cholera. Disinfection is achieved at this facility through chlorination using chlorine gas. The purpose of the Chlorine Contact Tanks is to allow sufficient time for the chlorine to disinfect the water.

6.2.8 TREATED WATER TANK

Treated water is being collected in treated water tank before being disposed of to water body.

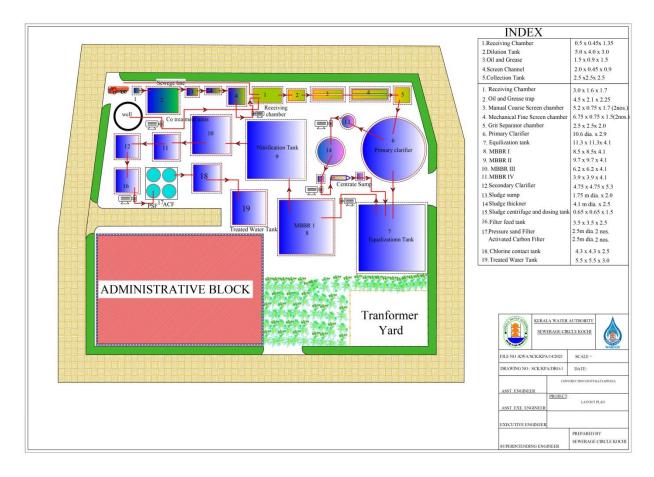


Figure 6.7 Layout of STP

6.3 SLUDGE MANAGEMENT

The solid particles separated from wastewater are in the form of slurry and known as sludge. The volume of sludge is more as it contains more water. Hence to reduce the volume of sludge, dewatering process is done with the help of centrifuges, sludge thickening units and sludge press. After this process, it is converted in the form of cake. The sludge from sewage is rich with nitrogen, phosphorous, Sulphur and other minerals which are essential for the growth of plants. Hence it can be used as manure. Further researches are going on this field to make this cake as a construction material but are in its infant stage.

CHAPTER - 7

DESIGN OF TREATMENT PLANT UNITS

7.1 DESIGN OF CO-TREATMENT UNITS FOR SEPTAGE

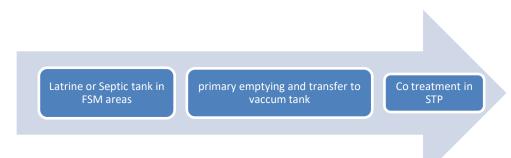


Fig.7.1 Containment, Emptying, Transportation, Treatment, End Use / Disposal

For the areas considered as septage zones, the households, institutions, commercial entities etc., shall undertake de-sludging of the septic tanks and pit once in every three years or when get filled up whichever is earlier as per the NBC code and CPHEEO guidelines. The most satisfactory method of sludge removal is by vacuum tankers. Though de-sludging frequencies vary, it is generally recommended to de-sludge tanks once every two to three years, or when the tank becomes one third full. Periodical de-sludging also helps to reduce the pollution levels in the liquid effluent, which normally enters waterways untreated. However, a small amount of sludge should be left in the tank to ensure that a minimum level of the necessary microorganisms responsible for anaerobic digestion remain in the tank. The gas generated due to anaerobic digestion might escape when tank is open for de-sludging. Hence, it is highly advisable to avoid using fire (or any incendiary material) in these cases. Regular de-sludging activities require wellorganized community and public/private service providers. Because of the delicate nature of septic systems housing microbial processes, care should also be taken not to scrub the septic clean or use chemicals such as detergents etc. to avoid the complete destruction

| DESIGN OF CO-TREATMENT UNIT FOR SEPTAGE WITH MOVING BED BIOFILM- REACTOR (MBBR) | | | | | | | | | | | |
|--|-------|-------------------|-------|-----|------|----------------------|--|--|--|--|--|
| Design population | 48675 | | | | | | | | | | |
| Sludge deposit coefficient | 95 | litres/person/yea | ar | | | | | | | | |
| Sludge deposit | 12.67 | KLD | | | | | | | | | |
| Average septage flow | 12.67 | KLD | | | | | | | | | |
| Working hours | 24 | | | | | | | | | | |
| Design flow | 12.67 | KLD | 12670 | LPD | 12.7 | m ³ /day | | | | | |
| Assumed peak factor | 1.5 | | 13 | KLD | 0.53 | m ³ /hour | | | | | |

| Peak design flow | 19.01 | KLD | | 19005 | LF | PD | 19 | m ³ /day |
|--|---------------|----------------|----------------------|-----------------|------|-----------|----------------|----------------------|
| | | | | | | | 0.79 | m ³ /hour |
| | | | | | | | 0.0002 | |
| Number of trips/day | 8 | | | | | | 2 | cum/sec |
| Quantity of septage obtained in single trip with peak factor | 2.38 | m ³ | | | | | | |
| Raw Septage Characteristics | 2.00 | | | | | | | |
| COD | | 25000 | mg/l | | | | | |
| BOD | | 5000 | mg/l | | | | | |
| TSS | | 7000 | mg/l | | | | | |
| Treated Sewage Characteristics | (after filtra | tion) | • | - | | | - | |
| COD | | 50 | mg/l | | | | | |
| BOD | | 10 | mg/l | | | | | |
| TSS | | 20 | mg/l | | | | | |
| Receiving Chamber | | | | | | | | |
| Average quantity of flow | | 0.53 | m ³ /hour | | | | | |
| Peak flow | | 0.79 | m ³ /hour | | | | | |
| | (|).00022 | m ³ /sec | | | | | |
| | | | | offset to |) | | | |
| Average Retention Time for peak f | flow | 600 | sec | wall | | 0.3 | m | |
| Volume of the inlet chember | | 0.1320 | m ³ | free boa | rd | 0.85 | m | |
| Assumed depth of flow | | 0.85 | m | total height | | 1.35 | m | |
| Assumed depth of now | | 0.05 | m | wall | | 1.35 | m | |
| Area required for inlet chamber | | 0.16 | m ² | thicknes | SS | 0.25 | m | |
| | | | | slab | | | | |
| Length of the tank | | 0.5 | m | thicknes | SS | 0.3 | m area in | |
| Breadth of the tank | | 0.31 | fix | 0. | 45 | m | m^2 | 2.48 |
| Design of Dilution Chamber from | n Mass-ba | lance Pr | inciple | _ | | | | |
| Target outflow BOD (actual incom | ing | | (3 | | | | | |
| BOD to STP) Target outflow TSS (actual incomi | ng | 265 | mg/l | | | | | |
| TSS to STP) | ng | 400 | mg/l | | | | | |
| Volume of recycled water used for | | | Ŭ | | | | | |
| dilution | | 45000 | litres | | | | | |
| Quantity of septage obtained as abo | ove | 2.38 | m ³ | ratio of | dilu | tion | 18.94 | |
| BOD of diluted septage | | 260.22 | mg/l | ok | | | | _ |
| TSS of diluted septage | | 370.01 | mg/l | ok | | | | |
| Total volume of dilution tank | | 47.38 | m ³ | | | | | |
| Liquid depth adopted inside dilutio tank | on | 2.50 | m | side of s | squa | re tank | 4.35 | m |
| Length of dilution tank adopted | | 5.00 | m | | 1 | | | |
| Breadth of dilution tank adopted | | 4.00 | m | volume | | 50.00 | m ³ | ok |
| Average outflow from dilution tank | k | 10.53 | m ³ /hour | | | 20.00 | | UII I |
| | | | | 0/ 0.11 | | 1 . | 1 | 14.00 |
| Average sewage flow entering the | 81P | 73.14 | m ³ /hour | % of dil | ute | d sepatge | to sewage | 14.39 |

| with diluted septage | | | | | | |
|---|---------|----------------------|-----------------------|----------|--------------|------|
| Oil and Grease Trap | | <u> </u> | <u> </u> | | | |
| Average quantity of flow | 10.53 | m ³ /hour | | | | |
| Peak flow | 15.79 | m ³ /hour | | | | |
| | 0.00439 | m ³ /sec | | | | |
| | 0.00437 | 111/300 | offset to | | | |
| Average Retention Time for peak flow | 300 | sec | wall | 0.15 | m | |
| Volume of the inlet chamber | 1.32 | m ³ | free board | 0.5 | m | |
| | | | total | | | |
| Assumed depth of flow | 1 | m | height wall | 1.5 | m | |
| Area required for inlet chamber | 1.32 | m^2 | thickness | 0.25 | m | |
| | | | slab | | | |
| Length of the tank | 1.5 | m | thickness | 0.3 | m area in | |
| Breadth of the tank | 0.88 | fix | 0.9 | m | m^2 | 3.91 |
| Breadth of baffle wall inside | 0.9 | m | | | | |
| Manual Coarse Screen Channel | | 1 | | 1 | | 1 |
| Peak design flow | 0.00439 | m ³ /sec | | | | |
| Number of screen | 1 | 111,500 | | | | |
| Peak flow rate per screen | 0.0044 | m ³ /sec | | | | |
| Velocity at peak flow | 0.75 | m/sec | assumed | | | |
| Velocity through clean bar screen | 0.85 | m/sec | | | | |
| | | | wall | | | |
| Length of channel U/S | 1 | m | thickness | 0.25 | m | |
| Width of channel provided | 0.45 | m | offset to wall | 0.25 | m | |
| wider of chamer provided | 0.40 | III | slab | 0.20 | 111 | |
| Depth of flow | 0.0130 | m | thickness | 0.30 | m | |
| Area required for screen | 0.0058 | sqm | | | | |
| | | | assuming head loss | | | |
| | | | coefficien | | | |
| Headloss through bar screen | 0.01 | m | t = 0.7 | | | |
| Assumed depth of flow after inserting | 0.1 | | 0.02 | (contro | | |
| bar screen Width of channel required | 0.1 | m | 0.02 fix | l value) | m | |
| width of channel required | 0.06 | m | 11x (20 to 50 | 0.45 | m | |
| Clear bar spacing | 20 | mm | mm) | | | |
| | | | (5 to 15 | | | |
| Bar thickness | 10 | mm | mm) | | | |
| Number of bars | 15 | | OV | | | |
| Clear bar spacing obtained | 21 | mm | OK | | area in | |
| Inside width of screen (openings) | 0.3 | m | | | m^2 | 2.9 |
| Full height of channel | 0.6 | m | fb | 0.3 | | |
| Angle of inclination | 45 | degree | 0.79 | rad | | |

| | 1 | | 1 | | 1 | |
|-------------------------------------|-----------------------|----------------------|--------|---------------------|----|--|
| | | (betwee | | | | |
| | | n 0.60 m/sec | | | | |
| | | and 0.90 | | | | |
| Actual velocity at peak flow | 0.59 | m/sec) | | | | |
| Length of channel required D/S | 0.60 | m | fix | 1 | m | |
| Sewage pump- for pumping to equalis | sation tank of | STP | | | | |
| Number of pumps | 1 | SB | 1 | | | |
| | submersibl | | | | | |
| | e | | | | | |
| | centrifugal sewage | | | | | |
| | transfer- | | | | | |
| Type of pump set | non clog | | | | | |
| Average flow | 10.53 | m ³ /hour | | | | |
| Peak design flow | 15.79 | m ³ /hour | | | | |
| Working hours | 23 | | | | | |
| Flow capacity of each pump | 16.48 | m ³ /hour | | | | |
| Peak factor | 1.20 | | | | | |
| Discharge | 5.49 | LPS | 0.0055 | m ³ /sec | | |
| Head required | 18 | m | | | | |
| Efficiency | 50% | | | | | |
| Power required | 2.64 | HP | fix | 3 | HP | |
| Energy | 45.24 | kwh | | | | |
| Recycled water pump- for pumping te | o dilution tank | <u>(</u> | | T | T | |
| Number of pumps | 1 | SB | 1 | | | |
| | submersibl | | | | | |
| | e centrifugal | | | | | |
| | sewage | | | | | |
| | transfer- | | | | | |
| Type of pump set | non clog | | | | | |
| Average flow | 10.00 | m ³ /hour | | | | |
| Peak design flow | 15.00 | m ³ /hour | | | | |
| Working hours | 23 | | | | | |
| Flow capacity of each pump | 15.65 | m ³ /hour | | | | |
| Peak factor | 1.20 | | | | | |
| Discharge | 5.22 | LPS | 0.0052 | m ³ /sec | | |
| Head required | 20 | m | | | | |
| Efficiency | 50% | | | | | |
| Power required | 2.78 | HP | fix | 3.5 | HP | |
| Energy | 47.74 | kwh | | | | |

| Recycled water pump- for pumping to | o dilution tank | | | | | |
|-------------------------------------|--|----------------------|--------|---------------------|----|--|
| Number of pumps | 1 | SB | 1 | | | |
| | Submersible centrifugal sewage transfer-non | | | | | |
| Type of pump set | clog | | | | | |
| Average flow | 10.00 | m ³ /hour | | | | |
| Peak design flow | 15.00 | m ³ /hour | | | | |
| Working hours | 23 | | | | | |
| Flow capacity of each pump | 15.65 | m ³ /hour | | | | |
| Peak factor | 1.20 | | | | | |
| Discharge | 5.22 | LPS | 0.0052 | m ³ /sec | | |
| Head required | 20 | m | | | | |
| Efficiency | 50% | | | | | |
| Power required | 2.78 | HP | fix | 3.5 | HP | |
| Energy | 47.74 | kwh | | | | |

7.2 DESIGN OF STP UNITS WITH MBBR TECHNOLOGY

| DESIGN OF ST | TP WITH MOV | ING BED B | IOFILM-REAC | TOR (ME | BBR) | |
|---|--------------------|----------------------|-------------|---------|--------|----------------------|
| Average flow from network | 1.44 | MLD | | | | |
| Working hours | 23 | | | | | |
| Flow from septage dilution tank | 10.53 | m ³ /hour | 0.25 | MLD | | |
| Design flow | 1.76 | MLD | 1755281 | LPD | 1755 | m ³ /day |
| | | | 1755 | KLD | 73.14 | m ³ /hour |
| Assumed peak factor | 2.25 | | | | | |
| Peak design flow | 3.949 | MLD | 3949382 | LPD | 3949 | m ³ /day |
| | | | | | 164.56 | m ³ /hour |
| Raw Sewage Characteristics | | | | | | |
| Average sewage flow entering the STP | 73.14 | m ³ /hour | | | | |
| Peak flow entering the STP | 164.56 | m ³ /hour | | | | |
| COD | 500 | mg/l | | | | |
| Primary ST/ET effluent BOD | 250 | mg/l | | | | |
| Thickener overflow return as fraction of plant flow | 0.15 | | | | | |
| Thickener overflow return | 0.263 | MLD | | | | |
| Thickener overflow return BOD | 350 | mg/l | | | | |
| Centrate from sludge dewatering as fraction of plant flow | 0.006 | | | | | |
| Centrate from sludge dewatering return | 0.01053 | MLD | | | | |
| Centrate from sludge dewatering return BOD | 280 | mg/l | | | | |

| Influent BOD to aeration tank | 263.1 | mg/l | | | | |
|---------------------------------|-----------------|---------------|-------------------|------|---------------|-------|
| TSS | 400 | mg/l | | | | |
| Total Nitrogen (As N) | 40 | mg/l | | | | |
| Total Phosphorous (As P) | 7 | mg/l | | | | |
| Faecal Coliform | 3E+07 | mpn/100 ml | | | | |
| E Coliform | 4E+07 | mpn/100 ml | | | | |
| Chlorides as Cl | 125 | mg/l | | | | |
| pH | 6 | | | | | |
| Treated Sewage Characteristics | Ŭ |) | | | | |
| COD | 50 | mg/l | | | | |
| BOD | 10 | mg/l | | | | |
| TSS | 20 | mg/l | | | | |
| Total Nitrogen (As N) | 10 | mg/l | | | | |
| Total Phosphorous (As P) | 1 | mg/l | | | | |
| E Coliform | 100 | mpn/100 ml | | | | |
| рН | 7 | 100 III | | | | |
| <u> </u> | | | | | | |
| Receiving Chamber | | | | | | |
| Average quantity of flow | 73.14 | m3/hour | | | | |
| Peak flow | 164.56 | m3/hour | | | | |
| | 0.05 | m3/sec | | | | |
| Average Retention Time for | | | | | | |
| peak flow | 120.00 | sec | offset to wall | 0.3 | m | |
| Volume of the inlet chember | 5.49 | m3 | free board | 0.5 | m | |
| Assumed depth of flow | 1.20 | m | total height | 1.7 | m | |
| | | | wall | | | |
| Area required for inlet chamber | 4.57 | m2 | thickness slab | 0.25 | m | |
| Length of the tank | 3.00 | m | thickness | 0.3 | m | |
| | 5.00 | 111 | tillekiless | 0.5 | area in | |
| Breadth of the tank | 1.52 | fix | 1.6 | m | m2 | 11.07 |
| Receiving Chamber | | | | | | |
| Average quantity of flow | 73.14 | m3/hour | | | | |
| Peak flow | 164.56 | m3/hour | | | | |
| | 0.05 | m3/sec | | | | |
| Average Retention Time for | | | | | | |
| peak flow | 120.00 | sec | offset to wall | 0.3 | m | |
| Volume of the inlet chamber | 5.49 | m3 | free board | 0.5 | m | - |
| Assumed depth of flow | 1.20 | m | total height | 1.7 | m | |
| Area required for inlet chamber | 4.57 | m2 | wall thickness | 0.25 | m | |
| Length of the tank | 3.00 | m | slab thickness | 0.3 | m . | ļ |
| Breadth of the tank | 1.52 | fix | 1.6 | m | area in m2 | 11.07 |
| Provide Receiving Chamber of | f capacity 3.00 | m x 1.60m x 1 | .20 m SWD | | | |

| Oil and Grease Trap | | | | | | |
|--|------------------|----------------------|------------------------|----------|----------------|-------|
| Average quantity of flow | 73.14 | m ³ /hour | | | | |
| Peak flow | 164.56 | m ³ /hour | | | | |
| I cak now | | m ³ /sec | | | | |
| Average Retention Time for | 0.0457 | m /sec | | | | |
| peak flow | 300 | sec | offset to wall | 0.15 | m | |
| Volume of the inlet chamber | 13.71 | m ³ | free board | 0.75 | m | |
| Assumed depth of flow | 1.5 | m | total height | 2.25 | m | |
| Area required for inlet chamber | 9.14 | m ² | wall thickness | 0.25 | m | |
| Length of the tank | 4.5 | m | slab thickness | 0.3 | m | |
| | | ~ | | | area in | |
| Breadth of the tank | 2.03 | fix | 2.1 | m | m ² | 15.37 |
| Breadth of baffle wall inside | 2.1 | m | | | | |
| Provide Oil and Grease t Manual Coarse Screen Channel | trap of capacity | 7 4.50 m x 2.1 | <u>10m x 1.50 m SW</u> | U | | |
| | | 2. | | | | |
| Peak design flow | 0.0457 | m ³ /sec | | | | |
| Number of screen | 1 | | | | | |
| Peak flow rate per screen | 0.0457 | m ³ /sec | | | | |
| Velocity at peak flow | 1 | m/sec | assumed | | | |
| Velocity through clean bar | 1.10 | 1 | | | | |
| screen | 1.10 | m/sec | wall | | | |
| Length of channel U/S | 1 | m | thickness | 0.25 | m | |
| Width of channel provided | 0.75 | m | offset to wall | 0.25 | m | |
| • | | | slab | | | |
| Depth of flow | 0.06 | m | thickness | 0.30 | m | |
| Area required for screen | 0.05 | sqm | agguning | | | |
| | | | assuming head loss | | | |
| | | | coefficient = | | | |
| Headloss through bar screen | 0.02 | m | 0.7 | | | |
| Assumed depth of flow after | 0.1 | | 0.09 | (control | | |
| inserting bar screen | 0.1 | m | 0.08 | value) | m | |
| Width of channel required | 0.46 | m | (20 to 50 | 0.75 | m | |
| Clear bar spacing | 20 | mm | (2010 50 mm) | | | |
| Bar thickness | 12 | mm | (5 to 15 mm) | | | |
| Number of bars | 23 | | | | | |
| Clear bar spacing obtained | 22 | mm | OK | | | |
| Inside width of screen (openings) | 0.474 | m | | | area in m^2 | 9.1 |
| Full height of channel | 1.2 | m | fb | 0.5 | | |
| Angle of inclination | 45 | degree | 0.79 | rad | | |

| | | (between | | | | |
|-----------------------------------|---------|---------------------|-----------------------|----------|---|--------|
| | | 0.60 m/sec | | | | |
| | | and 0.90 | | | | |
| Actual velocity at peak flow | 1.26 | m/sec) | | | | |
| Length of channel required D/S | 1.20 | m | fix | 4.2 | m | |
| Mechanical Fine Screen Channe | | | | | 1 | |
| Peak design flow | 0.046 | m ³ /sec | | | | |
| Number of screen | 1 | | | | | |
| Peak flow rate per screen | 0.046 | m ³ /sec | | | | |
| Velocity at peak flow | 0.8 | m/sec | assumed | | | |
| Velocity through clean bar | | | | | | |
| screen | 0.85 | m/sec | wall | | | |
| Length of channel U/S | 1 | m | thickness | 0.25 | m | |
| Width of channel provided | 0.75 | m | offset to wall | 0.25 | m | |
| | | | slab | | | |
| Depth of flow | 0.08 | m | thickness | 0.30 | m | |
| Area required for screen | 0.06 | sqm | | | | |
| | | | assuming head loss | | | |
| | | | coefficient = | | | |
| Headloss through bar screen | 0.01 | m | 0.7 | | | |
| Assumed depth of flow after | | | | (control | | |
| inserting bar screen | 0.37 | m | 0.08 | value) | | |
| Width of channel required | 0.15 | m | fix | 0.75 | m | |
| Clear bar spacing | 6 | mm | (up to 6 mm) | | | |
| Bar thickness | 10 | mm | (5 to 15 mm) | | | |
| Number of bars | 47 | | | | | |
| Clear bar spacing obtained | 6.1 | mm | | | | |
| Inside width of screen (openings) | 0.28 | m | | 0.5 | | |
| Full height of channel | 1 | m | fb | 0.5 | | |
| Angle of inclination | 70 | degree (between | 1.22 | rad | | |
| | | 0.60 m/sec | | | | |
| | | and 1.20 | | | | |
| Actual velocity at peak flow | 1.99 | m/sec) | | | | |
| Length of channel required D/S | 2.74 | m | fix | 2.75 | m | 2.8125 |
| Daily screening quantity | | | | | | |
| Daily sewage quantity | 1755.28 | m ³ /day | | | | |
| Rate of screening quantity | 0.015 | $m^3/1000 m^3$ | | | | |
| Daily screening quantity | 0.0263 | m ³ /day | | | | |
| Grit Separator | | | | | I | |
| Number of grit units | 1 | SB | 0 | | | |
| Peak flow | 0.0457 | m ³ /sec | | | | |
| Flow in one unit | 0.0457 | m ³ /sec | | | | |
| Grit particle size | 0.15 | mm | | | | |

| | | | (45 to 90 sec, | | | |
|---------------------------------------|--------|-------------------------------------|--------------------------------------|----------------|----------------|-------|
| HRT | 60 | sec | (45 10 50 see, typical 60) | | | |
| Volume of grit chamber | 2.74 | m ³ | | | | |
| SOR | 900 | m ³ /m ² /day | (empirical, from observations) | | | |
| | 0.010 | m ³ /m ² /sec | | | | |
| Area required | 4.39 | m ² | wall thickness | 0.25 | m | |
| SWD | 1.50 | m | slab thickness | 0.30 | m | |
| Side of square channel | 2.09 | m | offset to wall | 0.3 | m | |
| Fix length | 2.5 | m | freeboard | 0.5 | m | |
| Fix width | 2.5 | m | area given | 6.25 | m ² | OK |
| Shape factor | 0.85 | | volume given | 9.3750 | m ³ | OK |
| Specific gravity of liquid | 2.65 | | | | | |
| Kinematic viscosity | 1E-06 | m ² /sec | | | | |
| V _p in m/sec | 0.020 | let Nr < 1, ap to get termina | ply Stoke's law l velocity vp | | | |
| Nr | 3 | Apply Newton | 's equation | | | |
| Assumed velocity in m/sec | 0.0146 | | • | | | |
| Nr | 2 | | | | area in m^2 | 12.96 |
| drag coefficient Cd | 15.47 | | | | | |
| vp in m/sec | 0.014 | | | | | |
| Critical displacement velocity, Vc | 0.0145 | m/sec | | R _t | 1.67 | |
| Horizontal velocity of flow, Vh | 0.0122 | m/sec | OK | R _v | 1.19 | |

Provide Grit Separator of capacity 2.50 m x 2.50m x 1.50 m SWD

| Primary Clarifier | | | | | | |
|---------------------------------------|-------|-------|--|-----|----------|----------------------|
| Number of units | 1 | | | | | |
| Average flow to primary clarifier | 1.8 | MLD | 1755280.696 | LPD | 1755.281 | m ³ /day |
| | | | 1755.280696 | KLD | 73.14 | m ³ /hour |
| Assumed peak factor | 2.25 | | | | | |
| Peak design flow | 3.949 | MLD | 3949381.565 | LPD | 3949.382 | m ³ /day |
| | | | 3949.381565 | KLD | 164.56 | m ³ /hour |
| | | | (1.5 to 2.5 hours only for average | | | |
| Detention period at peak | 1 | hours | flow | | | |
| Removal efficiency of TSS expected | 65% | | to avoid septic conditions) | | | |

| Volume of settling zone of tank at peak flow164.56m³Height of settling zone2.38mfix H _{settling} 2.40m | |
|--|-----|
| efficiency57m/dayexperiments)Overflow area at average flow30.79m²required dia in m6.2Overflow area at peak flow69.29m²required dia in m9.3Volume of settling zone of tank at peak flow164.56m³6.4Height of settling zone2.38mfix H_settling2.40 | |
| Overflow area at average flow30.79m²required dia in m6.2Overflow area at peak flow69.29m²required dia in m9.2Volume of settling zone of tank at peak flow164.56m³164.56Height of settling zone2.38mfix H _{settling} 2.40 | |
| Overflow area at peak flow 69.29 m ² required dia in m 9.3 Volume of settling zone of tank at peak flow 164.56 m ³ 164.56 m ³ 164.56 Height of settling zone 2.38 m fix H _{settling} 2.40 m | 26 |
| Volume of settling zone of tank at peak flow164.56m³Height of settling zone2.38mfix H _{settling} 2.40m | |
| at peak flow164.56 m^3 Height of settling zone2.38mfix H _{settling} 2.40 | .39 |
| | |
| | |
| (settling zone | |
| dia+inlet | |
| Diameter of tank10.58mzone+outlet | |
| Diameter of tank 10.38 III 2010 Fix diameter of primary III III III | |
| sedimentation tank 10.60 m volume 88.24754 m ³ | |
| Depth of tank required 2.90 m | |
| Actual detention time for | |
| average flow 2.25 hours OK | |
| Weir overflow rate at peak flow 118.66 m ³ /m.day OK | |
| $\begin{array}{c c} area in \\ m^2 \end{array} 88.24'$ | 475 |
| Provide primary clarifier of 10.60 m dia and SWD 2.40 m | |
| Equalization Tank | |
| Average design flow 73.14 m ³ /hour | |
| Volume of tank required 456.00 m ³ from detailed analysis | |
| HRT 6.23 hours | |
| SWD 3.6 m | |
| Area required for equalization | |
| tank 126.67 m^2 free board 0.50 m | |
| Number of tanks proposed 1 offset to wall 0.45 m | |
| wall | |
| Area required for each tank 126.67 m^2 thickness 0.3 m | |
| Side if square tank11.25mfix length11.3m | |
| Thickness of foundation slab 0.45 m fix breadth 11.3 m | |
| Actual capacity provided 459.684 m^3 rectangular OK m^2 163.8 | 84 |
| | .04 |
| Provide Equalization tank of capacity 11.3 m x 11.30 m x 3.60 m SWD | |
| Sewage pump- for pumping to MBBR tank | |
| Number of pumps 1 SB 1 | |
| submersible | |
| centrifugal | |
| sewage transfer-non | |
| Type of pump set clog | |
| Average flow1755.28m³/day | |
| Peak design flow 3949.38 m ³ /day | |
| Working hours 23 | |

| | 7(22 | 3 /1 | | | | |
|--|------------------------|------------------------|-------------------------|---------------------|----|---|
| Flow capacity of each pump | 76.32 | m ³ /hour | | | | |
| Peak factor | 1.20 | | | 2. | | |
| Discharge | 25.44 | LPS | 0.0254 | m ³ /sec | | |
| Head required | 12 | m | | | | |
| Efficiency | 50% | | | | | |
| Power required | 8.14 | HP | fix | 9 | HP | |
| Energy | 139.67 | kwh | | | | |
| Moving Bed Bio-Reactor (MBBR | R)-Single Stage | | | | | 1 |
| Average design flow | 1755.28 | m ³ /day | | | | |
| Number of streams | 1 | | | | | |
| BOD of incoming sewage | 263.13 | mg/l | | | | |
| TSS of incoming sewage | 400 | mg/l | | | | |
| BOD expected after treatment | 10 | mg/l | | | | |
| BOD to be removed | 253.13 | mg/l | | | | |
| BOD removal % expected | 96.20 | | | | | |
| Number of tanks proposed | 1 | | | | | |
| | | | 4-7 | | | |
| BOD loading rate/volume | 4 | kg/m ³ /day | kg/m³/day as per M&E | | | |
| Actual BOD loading rate | 461.87 | kg/day | | | | |
| Quantity of BOD to be removed | 101.07 | Kg/duy | | | | |
| per day | 444.32 | kg/day | | | | |
| Volume of reactor required | 115.47 | m ³ | | | | |
| Surface area loading rate | | | | | | |
| (SALR) for BOD removal | 7.50 | g/m²/day | | | | |
| Required carrier surface area | 61582.62 | m^2 | | | | |
| Specific surface area of carrier | 600.00 | m^2/m^3 | | | | |
| Required carrier volume | 102.64 | m ³ | | | | |
| Volume of media required | 40% | | | | | |
| | 46.19 | m^3 | depth of base | 0.3 | m | |
| Volume of tank required-BOD | | | slab | | | |
| loading rate/volume method | 161.65 | m ³ | thickness | 0.35 | m | |
| Volume of tank required- SALR method | 256.59 | m ³ | offset to wall | 0.45 | m | |
| Volume of each tank | 256.59 | m ³ | total height | 4.10 | m | |
| | | | wall | | | |
| SWD | 3.6 | m | thickness | 0.30 | m | |
| Area of each tank | 71.28 | m ² | length | 8.5 | m | |
| Side of square tank | 8.44 | m | breadth | 8.5 | m | |
| Actual capacity provided- rectangular | 260.10 | m ³ | OK | | | |
| Fix capacity | 260.10 | m ³ | | | | |
| Actual volume of media obtained | 104.04 | m ³ | | | | |
| Actual carrier surface area | 62424.00 | m ² | | | | |

| Volume of liquid in the tank | 218.48 | m ³ | | | | |
|------------------------------|--------|----------------|-------|---------|---------|--------|
| Hydraulic Retension Time at | | | | | | |
| design average flow | 2.99 | hours | 179.2 | minutes | | |
| Hydraulic Retension Time at | | | | | | |
| peak flow | 1.33 | hours | 79.7 | minutes | | |
| | | | | | area in | |
| SARR for the given SALR | 6.94 | g/m²/day | | | m^2 | 100.00 |
| Estimated BOD removal rate | 433.07 | kg/day | | | | |
| | | BOD of | | | | |
| Actual BOD removal rate % | 93.76 | effluent | | 16.41 | mg/l | ok |

| Provide MBBR Tank 1 of capacity 8.50 m x 8.50 m x 3.60 m SWD | | | | | | | | |
|--|-----------------|---------------------|------------------------|-------|---------------|--------|--|--|
| Moving Bed Bio-Reactor (MBBF | R)-Single Stage | Nitrification | l | | 1 | | | |
| Average design flow | 1755.28 | m ³ /day | | | | | | |
| Number of streams | 1 | | | | | | | |
| BOD of incoming sewage | 20.00 | mg/l | | | | | | |
| NH ₄ -N of incoming sewage | 40.00 | mg/l | | | | | | |
| Alkalinity as CaCO ₃ | 140.00 | mg/l | | | | | | |
| Target effluent NH ₃ -N | 3.30 | mg/l | % removal | 91.75 | | | | |
| DL level to be maintained in tank | 2.00 | mg/l | | | | | | |
| Design minimum waste water temperature | 20.00 | °C | | | | | | |
| SARR _{max} | 0.61 | | SARR temp coefft. θ | | 1.058 | | | |
| Minimum NH ₃ -N at SARR _{max} | 0.50 | | SARR _T | 0.81 | g/m²/day | | | |
| Design value of SALR | 0.88 | g/m²/day | | | | | | |
| NH ₃ -N loading rate | 70.21 | kg/day | | | | | | |
| Required carrier surface area | 79662.60 | m²/day | | | | | | |
| Specific surface area of carrier | 600.00 | m^2/m^3 | | | | | | |
| Required carrier volume | 132.77 | m ³ /day | depth of base | 0.65 | m | | | |
| Volume of media required | 40% | | slab thickness | 0.35 | m | | | |
| Volume of tank required- SALR method | 331.93 | m ³ | offset to wall | 0.45 | m | | | |
| Volume of each tank | 331.93 | m ³ | total height | 4.10 | m | | | |
| SWD | 3.6 | m | wall thickness | 0.30 | m | | | |
| Area of each tank | 92.20 | m ² | length | 9.7 | m | 1 | | |
| Side of square tank | 9.60 | m | breadth | 9.7 | m | | | |
| Actual capacity provided- rectangular | 338.72 | m ² | OK | | | | | |
| Fix capacity | 338.72 | m ³ | | | | | | |
| Actual volume of media obtained | 135.49 | m ³ | | | | | | |
| Actual carrier surface area | 81292.80 | m ² | | | area in m^2 | 125.44 | | |

| Volume of liquid in the tank | 284.52 | m ³ | | | |
|------------------------------|--------|----------------|---------------|---------|--|
| Hydraulic Retension Time at | | | | | |
| design average flow | 3.89 | hours | 233.42 | minutes | |
| Hydraulic Retension Time at | | | | | |
| peak flow | 1.73 | hours | 103.74 | minutes | |
| | | | should be < | | |
| | | | 0.5 to | | |
| | | | achieve good | | |
| BOD SALR | 0.43 | g/m²/day | nitrification | | |

Using the equivalent weight of $CaCO_3$ as 50, the equivalent weight of $NaHCO_3$ as 84, the alkalinity use for nitrification as 7.14 g $CaCO_3/g$ NH₃-N and the target effluent alkalinity as 80 mg/L as $CaCO_3$, give the calculated alkalinity requirement as 118.5 mg/L as $CaCO_3$.

| Influent alkalinity | 140.00 | mg/l | | |
|--------------------------------------|--------|------------------------|--|--|
| Target effluent alkalinity | 80.00 | mg/l | | |
| | | g CaCO ₃ /g | | |
| Alkalinity used for Nitrification | 7.14 | NH ₃ -N | | |
| Alkalinity to be added | 202.04 | mg/l | | |
| Rate of alkalinity addition | | | | |
| needed as CaCO ₃ | 354.63 | kg/day | | |
| Equiv wt. of CaCO ₃ | 50.00 | g/equivalent | | |
| Equiv wt. of NaHCO ₃ | 84.00 | g/equivalent | | |
| | | kg/day | | |
| Daily NaHCO ₃ requirement | 595.78 | NaHCO ₃ | | |

Provide MBBR Tank 2 of capacity 9.70 m x 9.70 m x 3.60 m SWD

| Moving Bed Bio Reactor (MBBR | R)-post-anoxic d | lenitrificatio | 1 <u> </u> | | F | 1 | | |
|--|------------------|---|-------------------|------|---|---|--|--|
| Carbon:Nitrogen ratio (C/N) | 6.58 | | | | | | | |
| Average design flow | 1755 | m ³ /day | | | | | | |
| Number of post-anoxic tanks | 1.00 | | | | | | | |
| Target effluent NO ₃ -N concentration | 4.00 | mg/l | | | | | | |
| SALR for post-anoxic stage | 2.00 | g NO ₃ N /m ² /day | | | | | | |
| Estimate of SARR/SALR ratio | 0.886 | mg/l | | | | | | |
| Target % N removal | 91.75 | | | | | | | |
| Specific surface area of carrier | 600.00 | m^2/m^3 | | | | | | |
| NO ₃ -N daily loading rate | 64.42 | kg/day | | | | | | |
| Required carrier surface area | 32209.401 | m ² | | | | | | |
| Required carrier volume | 53.68 | m ³ | | | | | | |
| Volume of media required | 40% | | depth of base | 0.65 | m | | | |
| Volume of tank required- SALR method | 134.21 | m ³ | slab thickness | 0.35 | m | | | |
| Volume of each tank | 134.2 | m ³ | offset to wall | 0.45 | m | | | |
| SWD | 3.6 | m | total height | 4.10 | m | | | |
| Area of each tank | 37.28 | m ² | wall thickness | 0.30 | m | | | |

| DER for 1.76 MLD | capacity STP fo | r Sewerage Network& | FSSM at Kattapana |
|------------------|---------------------|---------------------|-------------------|
| | in provide a second | | |

| Diameter of circular tank | 6.89 | m | length | 6.2 | m | |
|---|---------------|---|---------|-------|---------------|-------|
| Side of square tank | 6.11 | m | breadth | 6.2 | m | |
| Actual capacity provided- rectangular | 138.38 | m ² | OK | | | |
| Fix capacity | 138.38 | m ³ | OK | | | |
| Actual volume of media obtained | 55.35 | m ³ | | | | |
| Actual carrier surface area | 33211.20 | m^2 | | | | |
| Volume of liquid in the tank | 116.24 | m ³ | | | area in m^2 | 59.29 |
| Hydraulic Retension Time at design average flow | 1.59 | hours | 95.36 | hours | | |
| Hydraulic Retension Time at peak flow | 0.71 | hours | 42.38 | hours | | |
| SARR | 1.77 | g/m²/day | | | | |
| Estimated NO ₃ -N removal rate | 58.86 | kg/day | | | | |
| NO ₃ -N of effluent | 3.17 | mg/l | | | - | |
| Alkalinity produced by denitrification | 3.57 | g CaCO ₃ /g NO ₃ -N removed | | | | |
| Actual alkalinity to be added | 82.33 | mg/l | | | | |
| Rate of alkalinity addition needed as CaCO ₃ | 144.51 | kg/day | | | | |
| Equiv wt. of CaCO ₃ | 50.00 | g/equivalent | | | | |
| Equiv wt. of NaHCO ₃ | 84.00 | g/equivalent | | | | |
| Daily NaHCO ₃ requirement | 242.78 | | | | | |
| 4.6 lb COD/lb NO ₃ -N removed an 4.6/1.5 = 3.1 lb methanol /lb NO ₃ - previously calculated NO ₃ -N remo | N removed. Th | | | | | |
| Methanol requirement in kg/day | 199.70 | kg/day | | | | |

Considering toxicity, economy and safety considerations it is better to adopt retrun activated sludge feed into anoxic tank for carbon source. Alkaline fermentation can be adopted for better results.

| Provide MBBR Tank | Provide MBBR Tank 3 of capacity6.20 m x 6.20 m x 3.60 m SWD | | | | | | | |
|------------------------------|--|------------------------|-----------------------------|--|--|--|--|--|
| Moving Bed Bio-Reactor (MBBH | Moving Bed Bio-Reactor (MBBR) chamber after de-nitrification | | | | | | | |
| Average design flow | 1755.28 | m ³ /day | | | | | | |
| Number of streams | 1 | | | | | | | |
| BOD of incoming sewage | 87.71 | mg/l | | | | | | |
| TSS of incoming sewage | 50 | mg/l | | | | | | |
| BOD expected after treatment | 7 | mg/l | | | | | | |
| BOD to be removed | 80.71 | mg/l | | | | | | |
| BOD removal % expected | 92.02 | | | | | | | |
| Number of tanks proposed | 1 | | | | | | | |
| | | | $\frac{4-7}{kg/m^3/day} as$ | | | | | |
| BOD loading rate/volume | 4 | kg/m ³ /day | per M&E | | | | | |
| Actual BOD loading rate | 153.96 | kg/day | | | | | | |

| Quantity of BOD to be removed | | | | | | |
|---|----------------|-----------------|-------------------|---------|----------------|-------|
| per day | 141.67 | kg/day | | | | |
| Volume of reactor required | 38.49 | m ³ | | | | |
| Surface area loading rate | | - | | | | |
| (SALR) for BOD removal | 15.00 | g/m²/day | | | | |
| Required carrier surface area | 10263.77 | m^2 | | | | |
| Specific surface area of carrier | 500.00 | m^2/m^3 | | | | |
| Required carrier volume | 20.53 | m ³ | | | | |
| Volume of media required | 40% | | | | | |
| | 15.40 | m ³ | depth of base | 0.9 | m | |
| Volume of tank required-BOD | | _ | slab | | | |
| loading rate/volume method | 53.88 | m ³ | thickness | 0.35 | m | |
| Volume of tank required- SALR | | 3 | <u> </u> | | | |
| method | 51.32 | m^3 | offset to wall | 0.45 | m | |
| Volume of each tank | 53.88 | m ³ | total height | 4.10 | m | |
| SWD | 20 | 100 | wall thickness | 0.20 | | |
| | 3.6 | $\frac{m}{m^2}$ | | 0.30 | m | |
| Area of each tank | 14.97 | | length | 3.9 | m | |
| Side of square tank | 3.87 | m | breadth | 3.9 | m | |
| Actual capacity provided- rectangular | 54.76 | m ³ | ОК | | | |
| Fix capacity | 54.76 | m ³ | | | | |
| Actual volume of media obtained | 21.90 | m ³ | | | | |
| | | m^2 | | | | |
| Actual carrier surface area | 10952.00 | $\frac{m}{m^3}$ | | | | |
| Volume of liquid in the tank Hydraulic Retension Time at | 46.00 | m | | | | |
| design average flow | 0.63 | hours | 37.7 | minutes | | |
| Hydraulic Retension Time at | 0.03 | nours | 51.1 | minutes | | |
| peak flow | 0.28 | hours | 16.8 | minutes | | |
| * | | | | | area in | |
| SARR for the given SALR | 13.13 | g/m²/day | | | m ² | 29.16 |
| Estimated BOD removal rate | 143.75 | kg/day | | | | |
| | | BOD of | | | | |
| Actual BOD removal rate % | 93.37 | effluent | | 5.82 | mg/l | ok |
| | | | | | | |
| Provide MBBR Tank 4 | of capacity 3. | 90 m x 3.90 | m x 3.60 m SWD |) | | |
| Blower air requirement | | | | | 1 | 1 |
| BOD loading | 615.83 | kg/day | | | | |

| Diower an requirement | | | | |
|--|--------|--------------------------|--|--|
| BOD loading | 615.83 | kg/day | | |
| NH ₃ -N loading rate | 70.21 | kg/day | | |
| | | kg of O ₂ /kg | | |
| Oxygen uptake ratio-BOD | 1.50 | of BOD | | |
| | | kg of O ₂ /kg | | |
| Oxygen uptake ratio-NH ₃ -N | 4.57 | of NH ₃ -N | | |
| Oxygen required for BOD | | | | |
| loading | 923.74 | kg/day | | |
| Oxygen required for NH ₃ -N | | | | |
| loading | 320.87 | kg/day | | |
| Percentage of O ₂ in air | 21.00 | | | |

| Weight of air required-BOD | | | | | |
|--|----------|--------------------------------------|-------|----|------|
| loading | 4398.76 | kg/day | | | |
| Weight of air required-NH ₃ -N | 1070.70 | ngiuuj | | | |
| loading | 1527.93 | kg/day | | | |
| Density of air | 1.225 | kg/m ³ | | | |
| Volume of air-BOD loading | 3590.82 | m ³ /day | | | |
| Volume of air-NH ₃ -N loading | 1247.29 | m ³ /day | | | |
| Air transfer efficiency of diffuser | 0.075 | | | | |
| Quantity of air required-BOD | | _ | | | |
| loading | 47877.64 | m ³ /day | | | |
| Quantity of air required-NH ₃ -N | 16620.52 | 3/1 | | | |
| loading | 16630.53 | m ³ /day | | | |
| Factor of saftey Volume of air required-BOD | 1.20 | | | | |
| loading | 2393.88 | m ³ /hour | | | |
| Volume of air required-NH ₃ -N | 2000.00 | iii / iio ui | | | |
| loading | 831.53 | m ³ /hour | | | |
| Volume of equalisation tank | 456.00 | m ³ | | | |
| Normal inflow | 0.020 | m ³ /sec | | | |
| Air requirement for equalisation | | | | | |
| tank | 1.25 | m ³ /m ³ /hour | | | |
| Air requirement for sludge tank | 3.00 | m ³ /m ³ /hour | | | |
| Volume of ET | 419.00 | m ³ | | | |
| Volume of air required for ET | 523.75 | m ³ /hour | | | |
| Volume of air required for ST | 10.45 | m ³ | | | |
| Total air required | 3759.60 | m ³ /hour | | | |
| Capacity of blower | 3760.00 | m ³ /hour | | | |
| Number of blowers working | 3.00 | SB | 1 | | |
| Air required per blower | 1253.33 | m ³ /hour | | | |
| Pressure given | 0.60 | kg/cm ² | 5.89 | m | |
| Volumetric efficiency | 50% | 0 | | | |
| Power required for blower motor | 55.03 | HP | 41.05 | kw | |
| Fix power of blower motor | 56.00 | НР | | | |
| Energy | 3007.87 | kwh | | | |
| Alum solution tank | | | • | | |
| number of units | 1 | | | | |
| dosage of alum | 25 | ppm | | | |
| requirement for 8 hours | 14.630 | kg | | | |
| volume of solution at 10% | | | | | |
| strength/unit | 0.13 | m ³ | | | |
| length of tank | 0.6 | m | | | |
| breadth of tank | 0.6 | m | | | |
| liquid depth | 0.36 | m | | | |
| total depth | 1 | m | | | |

| DER for 1.76 | MLD capacity STI | P for Sewerage N | Network& FSSM a | ıt Kattapana | | |
|---|---------------------------|-----------------------|------------------------------|--------------|-----|-------|
| | | 2 | | | | |
| solution flow rate | 0.0163 | m ³ /hour | | | | |
| Duovido Alum colution | touls of oon oo | 4 | (0 m v 1 00 m | | | |
| Provide Alum solution | i tank of capaci | <u>ity 0.00 m x 0</u> | .00 III X 1.00 III | | | |
| number of units | 1 | [| | | | |
| | - | | | | | |
| dosage of lime | 15 | ppm | | | | |
| requirement for 8 hours volume of solution at 10% | 8.78 | kg | | | | |
| strength/unit | 0.08 | m3 | | | | |
| length of tank | 0.6 | m | | | | |
| breadth of tank | 0.6 | m | | | | |
| liquid depth | 0.22 | m | | | | |
| total depth | 1 | m | | | | |
| | - | | | | | |
| solution flow rate | 0.01000 | m ³ /hour | | | | |
| Provide Lime solution | • | ty 0.60 m x 0 | .60 m x 1.00 m | | | |
| Secondary Clarifier with Plate/T | ube Settler | | | | | |
| Average output required from tube settler in MLD | 1.755 | 73.14 | m ³ /hour | 20.32 | LPS | |
| Number of batteries | | / 5.14 | III / IIOUI | 20.32 | LPS | |
| Average design flow as input in | 1 | | | | | |
| MLD/unit | 1.76 | 73.14 | m ³ /hour | 20.32 | LPS | |
| Width of plates in mm | 900 | space betwee | | 20 | mm | 23.10 |
| Length of plates adopted in m | 0.75 | · • | | | | |
| Angle of inclination of tubes | | | | | | |
| adopted in deg. | 60 | 1.05 | rad | | | |
| Relative length of settler | 27.5 | | wall | 0.2 | | |
| (dimensionless) $Lr = L/d$ Relative length is changed by L' | 37.5 | | thickness | 0.3 | m | |
| = 0.058 x [Vo x d/v] | | | column size | 0.35 | m | |
| Where Vo is velocity of flow | | | affrat to wall | 0.0 | | |
| along tube settler | | | offset to wall | 0.6 | m | |
| v is kinematic viscosity of water Effective relative length of tube, | | | depth of raft slab | 0.75 | m | |
| L = Lr - [0.058 x Vo x d/v] | | | thickness | 0.35 | m | |
| Kinematic viscosity of water in | | | r-beam | 0.00 | | |
| m/day | 0.087264 | | depth | 0.45 | m | |
| Effective relative length of | | | | | | |
| tube/plate, L | 37.5 | (-) | 0.013 | Vo | | |
| | 31.85 | | | | | |
| desirable value of relative length = | around 20 but below 40 | | | | | |
| for one unit: | | | freeboard | 0.5 | m | |
| Vertical water height in chamber | | | | | | |
| in m | 2.4 | | t-beam width | 0.35 | m | |
| Height of chamber in hopper portion in m | 2.4 | | t beem donth | 0.45 | m | |
| 1 | 2.4 | | t-beam depth r-beam width | 0.45 | m | |
| Side of large square in m | 4.75 | | | 0.35 | m | |
| Side of small square in m | 2 | | inlet pipe dia | 0.2 | m | |

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| | 1 | [| 1 | | | |
|---|------------------------------|------------------------|--------|--------------|-------------------|-------|
| h_3 in m (height of the truncated | 1.75 | | | | | |
| cone) | 1.75 | | | | | |
| Angle of inclination of hopper side to vertical | 0.520 | 29.82 | degree | 60.18 | deg. with hor. | |
| Larger inclined length L _i of | | 2 | | | | |
| slanting slab in m | 4.78 | area in m ² | 11.35 | | | |
| Smaller inclined length l_i of | 2 0 1 | . 2 | 2 0 1 | | | |
| slanting slab in m | 2.01 | area in m ² | 2.01 | | | |
| Contact area in m ² | 37.34 | | | | | |
| SOR in $m^3/m^2/day$ for upflow | | < | 50 | | | |
| clarifier | 47.01 | | | | | |
| | | volume of | | | | |
| | | hopper in | | | | |
| Trial volume in m ³ of one unit | 82.71 | m ³ | | | 28.56 | |
| Detention times in house | 1 1 2 | in accord | 0.74 | in honnor | 0.20 | hours |
| Detention time in hours | 1.13 | in square | 0.74 | hopper | 0.39 | hours |
| Fix volume | 45.00 | m ³ | | | | |
| Performance parameter of tube | | | | | | |
| settler $S = Vs/Vo x [sin\theta + L x]$ | | | | | | |
| cosθ] | | | | | | |
| For laminar flow regime, critical | | | | | | |
| performance parameter value for | | | | | | |
| complete removal of particle, | | | | | | |
| Critical value of performance | | | | | | |
| parameter, Sc = | 1.333 | circular | | | | |
| | 1.375 | square | | | | |
| | | parallel | | | | |
| | 1 | plates | | | | |
| Particle size in mm | 0.025 | | | | | |
| Settling velocity of particle in | | | | | | |
| m/sec, V _s (laminar) | 0.0006 | m/sec | 48.08 | m/d | | |
| Reynolds number, Nr | 0.014 | | | | | |
| Trial value of flow along plate | | | | | | |
| settler V _o in m/day | 424.78 | | | | | |
| | | (square, | | | | |
| | | circular, or | | | | |
| Shape of cross section of tubes | plates | plates) | | | | |
| Critical of performance | [(Vs/Vo) x | | | | | |
| parameter obtained, Sc | $(\sin\theta + L\cos\theta)$ | | | | | |
| | 1.90 | | | | | |
| Plate entrance area/one unit | 3.96 | m ² | | | | |
| Number of modules of plates | 2 | | | | | |
| Number of plates | 2 | | | | | |
| required/module | 110.00 | | | | | |
| Fix number of plates | | | | | | |
| required/module | 110 | | | | | |
| Length/module of tray holding | | | | | | |
| plates | 2800 | mm | | | | |
| Thickness of plate | 1.5 | mm | | | | |
| | 1.5 | | I | 1 | 1 | I |

| Number of plates configured in | | | | | |
|--|--------|-------------------------|----------|---------------------------|----------|
| one module | 114.82 | OK | | | |
| Height of plate module for 1m length of tubes inclined: | 0.87 | | | _ | <u> </u> |
| Hence height of tube module | 0.65 | m | | | |
| Fix length of plate module | 0.75 | m | | | |
| Fix height of plate module | 0.65 | m | | | |
| Fix number of plates required per module | 110 | | | | |
| Angle of inclination | 60 | degree to horizontal | | | |
| Contact area | 148.5 | m ² | | area in m ² | 42.90 |
| SOR in m ³ /m ² /day for plate settler | 11.33 | < | 40 | | |
| Total plate entrance area | 3.96 | m ² | | | |
| Actual velocity of flow in m/day | 424.78 | now correct | velocity | | |

Provide Secondary Clarifier with Plate/Tube Settler of 4.75 m x 4.75m x 4.80 m

| Sludge Sump | | | | | | |
|--|---------|----------------------|-------------------|------|---------------|------|
| Average flow | 1755.28 | m ³ /day | | | | |
| TSS | 400 | mg/l | | | | |
| BOD | 350.84 | mg/l | | | | |
| Assumed TSS Sludge | 30% | | | | | |
| Assumed BOD Sludge | 35% | | | | | |
| Sludge generated-TSS | 210.6 | kg/day | | | | |
| Sludge generated-BOD | 215.5 | kg/day | | | | |
| Total sludge | 426.17 | kg/day | | | | |
| % sludge with 1.02 specific gravity | 10% | | | | | |
| Sludge volume per day | 41.78 | m ³ /day | | | | |
| | 1.74 | m ³ /hour | | | | |
| Assumed HRT | 2 | hours | freeboard | 1.2 | m | |
| Volume of tank | 3.48 | m ³ | slab thickness | 0.3 | m | |
| Assumed SWD | 1.5 | m | offset to wall | 0.3 | m | |
| Area of the tank | 2.32 | m ² | wall thickness | 0.25 | m | |
| Diameter of circular tank | 1.72 | m | fix | 1.75 | m | |
| Actual capacity provided | 3.61 | m ³ | | | area in m^2 | 2.85 |
| Provide Sludge sump of capacity 1.75 m dia x 1.50 SWD | | | | | | |

| Provide Studge sump of capacity 1.75 m dia x 1.50 SWD | | | | | | | |
|---|------|---|---|----|--|--|--|
| Pump for Sludge transfer to Thickner | | | | | | | |
| Number of pumps | 1.00 | W | 1 | SB | | | |
| Specific gravity of liquid | 1.03 | | | | | | |

| | submersible centrifugal sewage | | | | | |
|--|--------------------------------------|-------------------------------------|-------------------|---------------------|---------------------------|----------|
| | transfer-non | | | | | |
| Tipe of pump set | clog | <u> </u> | + | | | |
| Working hours | 5.00 | hours | + | | | |
| Discharge required | 8.36 | m ³ /hour | 0.002321 | m ³ /sec | <u> </u> | ļ |
| Required head | 15.00 | m | <u> </u> | | <u> </u> | ļ |
| Velocity in sludge transfer pipe adopted | 0.70 | m/sec | | | | |
| Pipe diameter required | 64.98 | mm | fix | 90 | mm | |
| Efficiency | 50% | | | | | |
| Power required | 0.93 | HP | fix | 1.00 | HP | <u> </u> |
| Energy | 3.46 | kwh | | | | |
| Sludge Thickener | | | | | | |
| Number of units | 1 | | | | | |
| Total sludge | 426.17 | kg/day | | | | |
| Solids Loading Rate | 40 | kg/m²/day | | | | |
| Thickening area required | 10.65 | m ² | | | | |
| Surface Loading Rate | 12 | m ³ /m ² /day | | | | |
| Thickening area required | 3.48 | m ² | freeboard | 0.5 | m | <u> </u> |
| Maximum area | 10.65 | m ² | slab thickness | 0.35 | m | |
| Area of distribution chamber | 20% | ļ | offset to wall | 0.35 | m | <u> </u> |
| Total area required | 12.79 | m ² | wall thickness | 0.3 | m | |
| Diameter of circular tank | 4.03 | m | fix | 4.1 | m | |
| Thickening area available | 13.20 | m ² | 1 | | | |
| SWD | 2 | m | <u> </u> | | | |
| Actual volume provided | 26.41 | m ³ | | | | |
| Thickened sludge consistency | 3% | of total sludge volume | | | | |
| Thickened sludge volume | 12.79 | m ³ /day | | | area in m ² | 5.40 |

Provide Sludge thickener of 4.10 m dia x 2.00m SWD

| Pump for Sludge transfer to Centrifuge | | | | | | | | |
|---|------------|----------------------|------------------|---------------------|--|--|--|--|
| Type of pump set | Screw pump | | | | | | | |
| Number of pumps | 1.00 | W | 1 | SB | | | | |
| Volume of thickened sludge to be pumped | 12.79 | m ³ /day | | | | | | |
| Working hours of centrifuge | 5.00 | hours | | | | | | |
| Discharge required | 2.56 | m ³ /hour | 7.1E -0 4 | m ³ /sec | | | | |
| Head required | 15.00 | m | | | | | | |
| Efficiency | 50% | | | | | | | |

| Power required | 0.284 | fix | 0.30 | HP | | | | |
|--|--------|----------------------|------|-----|---------------|------|--|--|
| Energy | 1.060 | kwh | | | | | | |
| Sludge Centrifuge and Dosing Tanks | | | | | | | | |
| Number of centrifuges | 1 | SB | 1 | | | | | |
| Capacity of centrifuge | 0.25 | m ³ /hour | | | | | | |
| Poly electrolyte dozing for centrifuge & thickener | 10% | | | | | | | |
| Sludge volume | 426.17 | kg/day | | | | | | |
| Dose | 2 | kg/1000 kg | | | | | | |
| Quantity of Poly Electrolyte | 0.85 | kg/day | | | | | | |
| Concentration | 0.1 | | | | | | | |
| Volume of tanks @ 24 hour | 0.85 | m ³ | | | | | | |
| | 852.35 | litres | | | | | | |
| Volume | 35.51 | litres/hour | | | | | | |
| Volume required for 8 hours | 0.28 | m ³ | | | | | | |
| Liquid depth of tank | 1 | m | | | | | | |
| Area required | 0.28 | m ² | | | | | | |
| side of square tank | 0.53 | m | fix | 0.6 | area in m^2 | 0.72 | | |

Provide Sludge Centrifuge and Dosing tank of 0.60m x 0.60 m x 1.00m (1+stand by)

| Chlorine contact tank | | | | | | |
|-----------------------|-------|----------------------|----------------|------|---------|-------|
| HRT | 30 | minutes | offset to wall | 0.3 | m | |
| | | | wall | | | |
| Average flow | 73.14 | m ³ /hour | thickness | 0.25 | m | |
| | | _ | slab | | | |
| Volume of tank | 36.57 | m^3 | thickness | 0.3 | m | |
| Assumed liquid depth | 2 | m | freeboard | 0.5 | m | |
| | | | | | area in | |
| Area of the tank | 18.28 | m^2 | | | m^2 | 29.16 |
| side of square tank | 4.28 | m | fix | 4.3 | m | |

Provide Chlorine contact tank of 4.30 x 4.30 m x 2.00m (SWD)

| Filter feed tank | | | | | | | | | |
|----------------------|-------|----------------------|----------------|------|---------|-------|--|--|--|
| HRT | 20 | minutes | offset to wall | 0.3 | m | | | | |
| | | | wall | | | | | | |
| Average flow | 73.14 | m ³ /hour | thickness | 0.25 | m | | | | |
| | | | slab | | | | | | |
| Volume of tank | 24.38 | m ³ | thickness | 0.3 | m | | | | |
| Assumed liquid depth | 2 | m | freeboard | 0.5 | m | | | | |
| Area of the tank | 12.19 | m^2 | | | | | | | |
| side of square tank | 3.49 | m | fix length | 3.5 | m | | | | |
| | | | fix breadth | 3.5 | m | | | | |
| | | | | | area in | | | | |
| Volume provided | 24.50 | OK | | | m^2 | 21.16 | | | |

| Pressure Sand Filter | | | | | | | |
|-----------------------------|---------|--------------------------------------|----------------|-----|---------------|-------|--|
| Average flow | 1755.28 | m ³ /day | | | | | |
| Filter operating hours | 20 | hours | | | | | |
| Operating flow | 87.76 | m ³ /hour | | | | | |
| Filter Loading Rate | 12 | m ³ /m ² /hour | | | | | |
| Area of the filter required | 7.31 | m ² | | | | | |
| Number of filters | 2 | | | | | | |
| Area of each filter | 3.66 | sqm | | | | | |
| Diameter of filter required | 2.16 | m | fix | 2.5 | m | | |
| Height of the filter | 2.5 | m | offset to wall | 0.5 | m | | |
| Operating pressure | 3.5 | Bar | | | | | |
| Filter media | Sand | | | | area in m^2 | 20.48 | |
| | | | | | | | |

| Activated Carbon Filter | 1 | 1 | r | | r | 1 |
|-----------------------------|-----------|--------------------------------------|----------------|-----|---------|-------|
| Average flow | 1755.28 | m ³ /day | | | | |
| Filter operating hours | 20 | hours | | | | |
| Operating flow | 87.76 | m ³ /hour | | | | |
| Filter Loading Rate | 10 | m ³ /m ² /hour | | | | |
| Area of the filter required | 8.78 | m ² | | | | |
| Number of filters | 2 | | | | | |
| Area of each filter | 4.39 | sqm | | | | |
| Diameter of filter required | 2.36 | m | fix | 2.5 | m | |
| Height of the filter | 2.5 | m | offset to wall | 0.5 | m | |
| Operating pressure | 3.5 | Bar | | | | |
| | Activated | | | | area in | |
| Filter media | Carbon | | | | m^2 | 24.50 |

Provide Activated Carbon Filter of 2.50 m dia x 2.50m height(2 Nos.)

| Pump for clarified water to PSF and ACF | | | | | | | | | |
|---|--------|----------------------|---------|---------------------|---|--|--|--|--|
| Type of pump set | CF | | | | | | | | |
| Number of pumps | 1.00 | W | 1 | SB | 1 | | | | |
| Discharge of clarified water required | 73.14 | m ³ /hour | | | | | | | |
| Working hours of pumps | 20.00 | hours | | | | | | | |
| Discharge required | 87.76 | m ³ /hour | 2.4E-02 | m ³ /sec | | | | | |
| Head required | 35.00 | m | | | | | | | |
| Efficiency | 50% | | | | | | | | |
| Power required | 22.75 | fix | 23.00 | HP | | | | | |
| Energy | 339.48 | kwh | | | | | | | |

| Treated Water Tank | | | | - | | |
|--|---------|----------------------|-------------------|------|---------------------------|-------|
| HRT | 60 | minutes | offset to wall | 0.3 | m | |
| Average flow | 73.14 | m ³ /hour | wall thickness | 0.25 | m | |
| Volume of the tank | 73.1 | m ³ | slab thickness | 0.3 | m | |
| Assumed liquid depth | 2.5 | m | freeboard | 0.5 | m | |
| Area of the tank | 29.25 | m ² | | | | |
| Number of tanks | 1 | | fix length | 5.5 | m | |
| Area of one tank | 29.25 | m^2 | fix breadth | 5.5 | m | |
| Side of square tank | 5.41 | m | | | | |
| Volume provided | 75.63 | m ³ | ОК | | area in m ² | 43.56 |
| Administrative bldg, lab, chemical store etc(30*25) | 750.00 | | | | | |
| Transformer yard (12*12) | 144.00 | | | | | |
| Total area of units | 1693.21 | m ² | | | | |
| Movement space factor | 1.6 | | | | | |
| Total area rquired | 2709.14 | m ² | 0.67 | Acre | | |

Provide Treated Water Tank of capacity 5.50 m x 5.50 m x 2.50m SWD

7.3 DESIGN OF COLLECTION WELLS

| DESIGN OF COLLECTION WELL No.1 | | | | | |
|----------------------------------|-------|----------------|----|------|--|
| Average inflow into well from | | | | | |
| network | 6.24 | LPS | | | |
| Peak inflow into well from | | ~ | | | |
| network | 18.72 | LPS | PF | 3.00 | |
| Average flow into well from | | | | | |
| other well | 0 | LPS | | | |
| Peak flow into well from other | | | | | |
| well | 0 | LPS | | | |
| Total average inflow into well | | | | | |
| from network+other well | 6.24 | LPS | | | |
| Total peak inflow into well from | | | | | |
| network+other well | 18.72 | LPS | | | |
| Peak hours | 4 | | | | |
| Number of pumps operated in | | | | | |
| peak hours | 2 | | | | |
| Rated outflow during peak | | | | | |
| hours/pump in parallel | 6.24 | LPS | | | |
| Total rated outflow in peak | | | | | |
| hours | 12.48 | LPS | | | |
| Inflow converted into storage | | | | | |
| during peak hours | 6.24 | LPS | | | |
| Volume of sewage to be stored | 89.86 | m ³ | | | |

| in well | [| | | |
|--|----------|----------------|------------|--------------|
| | | | | |
| Diameter of collection well- | () | | | |
| inner | 6.2 | m | | |
| Depth of collection well for | 3 | 122 | | |
| storage | | m | | |
| Volume of sewage actually stored in well | 90.57 | m ³ | ok | |
| | | | ОК | |
| Wall thickness of collection well | 0.45 | m | | |
| Base slab thickness | 0.45 | m | | |
| Offset to base slab | 0.45 | m | | |
| Outer dia of collection well | 7.1 | m | | |
| Freeboard of collection well | 0.5 | m | | |
| Distance of travel in pumping to | | | | |
| next station | 50 | m | | |
| Velocity of travel adopted | 0.7 | m/sec | | |
| Diameter of pumping line | | | | |
| required | 150.67 | mm | fix OD | 225 |
| | | pressure | rating | PN 10 |
| Total head for the pump set | 37 | m | | |
| Discharge for the pump set | 12.48 | LPS | efficiency | 0.5 |
| Power required for pump | | | | |
| set/number | 12.31 | HP | fix HP | 15 |
| DESIGN OF COLLECTION W | ELL No.2 | I | | |
| Average inflow into well from | | | | |
| network | 2.27 | LPS | | |
| Peak inflow into well from | | | | |
| network | 6.81 | LPS | PF | 3.00 |
| Average flow into well from | | | | |
| other well | 0 | LPS | | |
| Peak flow into well from other | | | | |
| well | 0 | LPS | | |
| Total average inflow into well | | | | |
| from network+other well | 2.27 | LPS | | |
| Total peak inflow into well from | | | | |
| network+other well | 6.81 | LPS | | |
| Peak hours | 4 | | | |
| Number of pumps operated in | | | | |
| peak hours | 2 | | | |
| Rated outflow during peak | | | | |
| hours/pump in parallel | 2.27 | LPS | | |
| Total rated outflow in peak | | | | |
| hours | 4.54 | LPS | | |
| Inflow converted into storage | | | | |
| during peak hours | 2.27 | LPS | | |
| Volume of sewage to be stored | | 3 | | |
| in well | 32.69 | m ³ | | |
| Diameter of collection well- | 4.6 | m | | |

| inner | | | | |
|-----------------------------------|-------|----------------|------------|-------|
| Depth of collection well for | | | | |
| storage | 2 | m | | |
| Volume of sewage actually | | 2 | | |
| stored in well | 33.24 | m ³ | ok | |
| Wall thickness of collection well | 0.45 | m | | |
| Base slab thickness | 0.45 | m | | |
| Offset to base slab | 0.45 | m | | |
| Outer dia of collection well | 5.5 | m | | |
| Freeboard of collection well | 0.5 | m | | |
| Distance of travel in pumping to | | | | |
| next station | 900 | m | | |
| Velocity of travel adopted | 0.7 | m/sec | | |
| Diameter of pumping line | | | | |
| required | 90.87 | mm | fix OD | 140 |
| • | | pressure | rating | PN 10 |
| Total head for the pump set | 32 | m | | |
| Discharge for the pump set | 4.54 | LPS | efficiency | 0.5 |
| Power required for pump | | LID | | 0.5 |
| set/number | 3.87 | HP | fix HP | 5 |
| DESIGN OF COLLECTION W | | 111 | | 0 |
| Average inflow into well from | | | | |
| network | 2.37 | LPS | | |
| Peak inflow into well from | 2.07 | LIU | | |
| network | 7.11 | LPS | PF | 3.00 |
| Average flow into well from | | ~ | | |
| other well | 0 | LPS | | |
| Peak flow into well from other | | | | |
| well | 0 | LPS | | |
| Total average inflow into well | | | | |
| from network+other well | 2.37 | LPS | | |
| Total peak inflow into well from | | | | |
| network+other well | 7.11 | LPS | | |
| Peak hours | 4 | | | |
| Number of pumps operated in | | | | |
| peak hours | 2 | | | |
| Rated outflow during peak | | | | |
| hours/pump in parallel | 2.37 | LPS | | |
| Total rated outflow in peak | | | | |
| hours | 4.74 | LPS | | |
| Inflow converted into storage | | | | |
| during peak hours | 2.37 | LPS | | |
| Volume of sewage to be stored | | 3 | | |
| in well | 34.13 | m ³ | | |
| Diameter of collection well- | | | | |
| inner | 4.6 | m | | |

| Depth of collection well for | 2.2 | | | |
|--|----------|----------------|------------|--------------|
| storage | 2.2 | m | | |
| Volume of sewage actually stored in well | 36.56 | m ³ | ok | |
| | | | ОК | |
| Wall thickness of collection well | 0.45 | m | | |
| Base slab thickness | 0.45 | m | | |
| Offset to base slab | 0.45 | m | | |
| Outer dia of collection well | 5.5 | m | | |
| Freeboard of collection well | 0.5 | m | | |
| Distance of travel in pumping to | | | | |
| next station | 900 | m | | |
| Velocity of travel adopted | 0.7 | m/sec | | |
| Diameter of pumping line | | | | |
| required | 92.85 | mm | fix OD | 140 |
| | | pressure | rating | PN 10 |
| Total head for the pump set | 21.5 | m | | |
| Discharge for the pump set | 4.74 | LPS | efficiency | 0.5 |
| Power required for pump | | | | |
| set/number | 2.72 | HP | fix HP | 5 |
| DESIGN OF COLLECTION W | ELL No.4 | | | |
| Average inflow into well from | | | | |
| network | 2.58 | LPS | | |
| Peak inflow into well from | | | | |
| network | 7.74 | LPS | PF | 3.00 |
| Average flow into well from | | | | |
| other well | 0 | LPS | | |
| Peak flow into well from other | | | | |
| well | 0 | LPS | | |
| Total average inflow into well | | | | |
| from network+other well | 2.58 | LPS | | |
| Total peak inflow into well from | | | | |
| network+other well | 7.74 | LPS | | |
| Peak hours | 4 | | | |
| Number of pumps operated in | | | | |
| peak hours | 2 | | | |
| Rated outflow during peak | | | | |
| hours/pump in parallel | 2.58 | LPS | | |
| Total rated outflow in peak | | | | |
| hours | 5.16 | LPS | | |
| Inflow converted into storage | | LDC | | |
| during peak hours | 2.58 | LPS | | |
| Volume of sewage to be stored | 05.15 | 3 | | |
| in well | 37.15 | m ³ | | |
| Diameter of collection well- | | | | |
| | 6 | m | | |
| Depth of collection well for | | | | |
| storage | 1.4 | m | | |

| Malana af a serie a stability | | | | |
|--|-----------|----------------|------------|-------|
| Volume of sewage actually stored in well | 20.59 | m ³ | ale | |
| | 39.58 | | ok | |
| Wall thickness of collection well | 0.45 | m | | |
| Base slab thickness | 0.45 | m | | |
| Offset to base slab | 0.45 | m | | |
| Outer dia of collection well | 6.9 | m | | |
| Freeboard of collection well | 0.5 | m | | |
| Distance of travel in pumping to | | | | |
| next station | 900 | m | | |
| Velocity of travel adopted | 0.7 | m/sec | | |
| Diameter of pumping line | | | | |
| required | 96.88 | mm | fix OD | 160 |
| | | pressure | rating | PN 10 |
| Total head for the pump set | 21 | m | | |
| Discharge for the pump set | 5.18 | LPS | efficiency | 0.5 |
| Power required for pump | | | | |
| set/number | 2.90 | HP | fix HP | 5 |
| DESIGN OF COLLECTION W | 'ELL No.5 | | · | · |
| Average inflow into well from | | | | |
| network | 3.22 | LPS | | |
| Peak inflow into well from | | | | |
| network | 9.66 | LPS | PF | 3.00 |
| Average flow into well from | | | | |
| other well | 0 | LPS | | |
| Peak flow into well from other | | | | |
| well | 0 | LPS | | |
| Total average inflow into well | | | | |
| from network+other well | 3.22 | LPS | | |
| Total peak inflow into well from | | | | |
| network+other well | 9.66 | LPS | | |
| Peak hours | 4 | | | |
| Number of pumps operated in | | | | |
| peak hours | 2 | | | |
| Rated outflow during peak | 2.22 | I DC | | |
| hours/pump in parallel | 3.22 | LPS | | |
| Total rated outflow in peak | C 1 1 | LDC | | |
| hours | 6.44 | LPS | | |
| Inflow converted into storage | 2.22 | TDC | | |
| during peak hours | 3.22 | LPS | | |
| Volume of sewage to be stored in well | 46.37 | m ³ | | |
| Diameter of collection well- | 40.37 | 111 | | |
| inner | 7 | m | | |
| Depth of collection well for | / | m | | |
| - | 1.25 | m | | |
| storage Volume of sewage actually | 1.23 | 111 | | |
| stored in well | 48.11 | m ³ | ok | |
| | 40.11 | 111 | UK | |

| Wall thickness of collection well | 0.45 | m | | |
|-----------------------------------|--------|---------------|------------|-------|
| Base slab thickness | 0.45 | m | | |
| Offset to base slab | 0.45 | m | | |
| Outer dia of collection well | 7.9 | m | | |
| Freeboard of collection well | 0.5 | m | | |
| Distance of travel in pumping to | | | | |
| next station | 900 | m | | |
| Velocity of travel adopted | 0.7 | m/sec | | |
| Diameter of pumping line | | | | |
| required | 108.23 | mm | fix OD | 180 |
| | | pressure rati | ing | PN 10 |
| Total head for the pump set | 70 | m | | |
| Discharge for the pump set | 6.44 | LPS | efficiency | 0.5 |
| Power required for pump | | | | |
| set/number | 12.02 | HP | fix HP | 15 |

7.4 PRELIMINARY STRUCTURAL DESIGN OF COMPONENTS

For the various units of the STP, structural analysis and design have been performed in accordance with the stipulations of all relevant Indian Standard Codes of practice. For the reinforced concrete elements, special attention has been given to arrive at the preliminary dimensions to satisfy norms and conditions for the water retaining structures. For the metallic structures like pressure filter units, similar approach has been adopted. Since the units are constantly in contact with aggressive environment like sewage, noncorrosive coating for reinforcing steel and water proofing application for the inner side of reinforced concrete structures are recommended. These provisions are already given in the detailed estimates. During the execution stage, a detailed structural analysis of the components can be performed. However, the dimensions are expected to fall within the limits of the values obtained from the preliminary analysis. In the case of foundations, simple raft and beam-slab type raft is adopted for safety considerations. Since the soil nature is observed to be satisfactory to withstand medium loading conditions, deep foundations are not suggested. Soil analysis reports available for the locality have been examined to arrive at a decision. However, during the execution stage, detailed soil investigations can be performed. Cover for the reinforced concrete elements are to be given in accordance with the exposure conditions given in the IS 456 Code of practice. Even though, most of the components are designed as reinforced concrete, innovative materials with high strength to weight ratio like Fibre Reinforce Polymers (FRPs) can also be tried after performing detailed structural analysis. Manholes and pipelines are to be checked for external traffic loads pertaining to the characteristics of each road and soil conditions. Since the accurate data of this will be obtained during the execution stage of the project, the detailed structural analysis of the

DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana

| | SIZING OF STP UNITS | | | | | |
|----------|---|------|------|------|----------------|----------------------|
| Sl No | Components | L | В | Н | No of units | Type of construction |
| 1 | Receiving Chamber STP | 3 | 1.6 | 1.7 | 1 | RCC |
| 2 | Receiving Chamber CTU | 0.5 | 0.45 | 1.35 | 1 | RCC |
| 3 | Oil and Grease trap STP | 4.5 | 2.1 | 2.25 | 1 | RCC |
| 4 | Oil and Grease trap CTU | 1.5 | 0.9 | 1.5 | 1 | RCC |
| 5 | Manual Coarse Screen Channel STP | 5.2 | 0.75 | 1.7 | 2 | RCC |
| 6 | Manual Coarse Screen Channel CTU | 2 | 0.45 | 0.9 | 1 | RCC |
| 7 | Manual Fine Screen Channel STP | 6.75 | 0.75 | 1.5 | 2 | RCC |
| 8 | Dilution tank for CTU | 5 | 4 | 3 | 1 | RCC |
| 9 | Collection tank for CTU | 2.5 | 2.5 | 2.5 | 1 | RCC |
| 10 | Grit Separator | 2.5 | 2.5 | 2 | 1 | RCC |
| 11 | Primary Clarifier | Dia | 10.6 | 2.9 | 1 | RCC |
| 12 | Equalization Tank | 11.3 | 11.3 | 4.1 | 1 | RCC |
| 13 | Moving Bed Bio Reactor 1 | 8.5 | 8.5 | 4.1 | 1 | RCC |
| 14 | Moving Bed Bio Reactor 2 | 9.7 | 9.7 | 4.1 | 1 | RCC |
| 15 | Moving Bed Bio Reactor 3 | 6.2 | 6.2 | 4.1 | 1 | RCC |
| 16 | Moving Bed Bio Reactor 4 | 3.9 | 3.9 | 4.1 | 1 | RCC |
| 17 | Secondary Clarifier with Plate Settler | 4.75 | 4.75 | 5.3 | 1 | RCC |
| 18 | Filter Feed Tank | 3.5 | 3.5 | 2.5 | 1 | RCC |
| 19 | Sludge Sump | Dia | 1.75 | 2 | 1 | RCC |
| 20 | Sludge Thickener | Dia | 4.1 | 2.5 | 1 | RCC |
| 21 | Chlorine Contact Tank | 4.3 | 4.3 | 2.5 | 1 | RCC |
| 22 | Treated Water Tank | 5.5 | 5.5 | 3 | 1 | RCC |
| 23 | Alum Solution Tank | 0.6 | 0.6 | 1 | 2 | FRP/HDPE |
| 24 | Lime Solution Tank | 0.6 | 0.6 | 1 | 2 | FRP/HDPE |
| 25 | Hypo Dosing Tank | 0.6 | 0.6 | 1 | 2 | FRP/HDPE |
| 26 | Administrative Building,Office cum laboratory, etc. | 10 | 00 | sqm | | RCC |

pipelines and manholes will be required to be performed later and the changes are to be incorporated accordingly. The detailed structural design has to be carried out after conducting soil investigation test.

ELECTRO-MECHANICAL UNITS Submersible Sewage Transfer pump to MBBR 9 2 Centrifugal 1 HP 2 Manual Coarse Screen-STP 20 Opening 1 SS 304 mm 3 Manual Coarse Screen- CTU 20 Opening SS 304 mm 1 4 Manual Fine Screen- STP 1 SS 304 6 mm Opening Air Grid and Diffused aeration system for ET, MBBR Tanks and Sludge Tank PVC 5 As per Design 6 MBBR Carrier As per Design **PVC/HDPE** 3 + 17 Air Blowers 1253.3 m3/hour SB 8 Plate Settlers SS As per Design Submersible 9 Sludge transfer pump to thickener 1 HP 2 Centrifugal HP 10 Sludge transfer pump to centrifuge 0.3 2 Screw type pump 11 Sludge Centrifuge 0.25 m3/hour 2 Submersible Pump for clarified water to PSF and 12 ACF 23 HP 2 Centrifugal MS with all 13 Pressure Sand Filter (Dual media) Dia 2.5 m 2 specials MS with all 14 Activated Carbon Filter Dia 2.5 m 2 specials High Pressure 15 Jetting/Cleaning machine 1 pump Diesel type automatic switch 16 Generator 1 over Electro type of 17 Chlorinator similar Discharge,BOD,Do ,TSS,pH sensors 18 Iot based sensors

Table 7.1: Size of STP units

CHAPTER - 8

PROJECT ESTIMATED COST

8.1 LAND DEVELOPMENT

The land required for construction of sewerage treatment plant is 100cents and the site proposed is Housing board plot with Sy.No.39/6-9 near Bypass road (Block-58). Municipal council resolution in this regard is obtained and is enclosed as Annexure 5. Total land required for the Collection wells are 30 cents (approximately six cents for each well) and the proposed lands are private lands intended to be acquired and handed over by Municipality .In which, the land location of well no.3 is within the proposed site of STP.

8.2 PHYSICAL INFRASTRUCTURE

8.2.1 SEWERAGE NETWORK SYSTEM

The total length of sewer network is 27406m in which 27000m of 225mm HDPE PE100 PN8 pipe and 406m of 285mm HDPE PE100 PN8 pipe are proposed in the project. The network includes 750 Nos. manholes of 900mm diameter, 79Nos. 1200mm diameter and 271 Nos. 1500mm diameter for a depth varying from 1.5 m to 6m.

Total length of Pumping main is 5481m of HDPE PE100 PN-10 pipes from 5 nos of wells to STP and 720 m of HDPE PE100 PN-10 pipes for lifting stations.

The total cost of this network system and pumping main comes to Rs.4537.72 lakhs as per DSR 2018 rates including GST. Detailed break up of estimate is appended.

8.2.2 COLLECTION WELL CUM PUMP HOUSES

There are 5 Nos. of collection wells and out of which I No. is to be constructed in the premises of proposed STP land in Housing board plot. The diameter of 5 wells are 6.2m, 4.6m (2nos.),6m and 7m and corresponding depths are 6.65m, 5.15m,5.75m,6.76m & 9.53m respectively. The total cost is Rs.103.93 lakhs. Detailed estimate attached.

8.2.3 ROAD RESTORATION CHARGES

The cost is estimated based on the standard rate for road restoration charges to be remitted to various departments. The total cost is estimated as Rs. 1731.87 lakhs.

8.2.4 SEWERAGE TREATMENT PLANT UNITS

The total cost for the sewerage treatment plant units with co- treatment units comes to Rs.365.05 Lakhs and detailed estimate is attached.

8.2.5 MECHANICAL ITEMS

The total cost for Mechanical Items comes to Rs.266.56 Lakhs including screens, pump sets, Aeration system, PSF, ACF, MBBR carrier etc. Detailed estimate attached.

8.2.6 ELECTRICAL & INSTRUMENTATION ITEMS

The total cost for Electrical and Instrumentation items comes to Rs.72.70 Lakhs including Generator; IoT based sensor and control units, provision for solar units etc.

8.3 TOTAL ESTIMATED COST

The total Estimated Cost comes to **Rs.101.161** Crores including 10%, 2.5% and 18% for Centage, DPR preparation charge and GST respectively. A provision for O&M for 10 years to an amount of Rs.12.339 Crores has also been incorporated in the DPR.

| | ABSTRACT OF ESTIMATED COST | | | | | | |
|-------------|---|-----------------|--|--|--|--|--|
| Sl. No. | ITEM | AMOUNT (INR) | | | | | |
| CIVIL ITEMS | | | | | | | |
| 1 | Site Preparation-LS | ₹ 4,500 | | | | | |
| 2 | OG Trap, Receiving Chamber, Screen, Grit Chamber | ₹ 2,420,996 | | | | | |
| 3 | Equalisation Tank | ₹ 5,816,692 | | | | | |
| 4 | Dilution tank for co treatment | ₹ 1,274,343 | | | | | |
| 5 | Collection Tank for Co treatment -rectangular | ₹ 554,758 | | | | | |
| 6 | Primary Clarifier | ₹ 3,681,527 | | | | | |
| 7 | MBBR Tank-1 | ₹ 6,277,552 | | | | | |
| 8 | MBBR Tank-2 | ₹ 4,769,863 | | | | | |
| 9 | MBBR Tank-3 | ₹ 2,680,891 | | | | | |
| 10 | MBBR Tank-4 | ₹ 1,511,121 | | | | | |
| 11 | Clarifier with Tube/Plate Settler | ₹ 1,745,782 | | | | | |
| 12 | Sludge Sump and Thickener | ₹ 2,643,054 | | | | | |
| 13 | Chlorine Contact Tank and Treated Water Tank | ₹ 2,255,778 | | | | | |
| 14 | Filter feed tank | ₹ 868,490 | | | | | |
| 15 | Buffer zone with vegetation ,Green Belt and Landscaping | ₹ 1,155,000 | | | | | |
| 16 | Facility for Recycling Purposes | ₹ 150,000 | | | | | |
| 17 | Construction of administation cum laboratary building including Compound wall | ₹ 17,500,000 | | | | | |
| 18 | Pump house building above wells & compound wall for well site | ₹ 6,900,000 | | | | | |
| 19 | Equipment, Laboratory items, Furniture and Computer | ₹ 133,929 | | | | | |
| 20 | Sewer network with pipelines, chambers and wells | ₹ 464,165,336 | | | | | |
| | TOTAL OF CIVIL ITEMS | ₹ 526,509,610 | | | | | |
| | | | | | | | |
| | MECHANICAL ITEMS | | | | | | |
| 1 | Bar Screens | ₹ 1,000,000 | | | | | |
| 2 | Pump sets and Aeration system | ₹ 9,719,140 | | | | | |
| 3 | PSF & ACF | ₹ 6,222,220 | | | | | |
| 4 | Centrifuge | ₹ 400,000 | | | | | |
| 5 | Bypass arrangements, steel ladder and frame work | ₹ 350,000 | | | | | |

| 6 | Piping and Valves | ₹ 200,893 | | |
|---|---|-----------------|--|--|
| 7 | MBBR Carrier and other items | ₹ 7,778,179 | | |
| 8 | Tube settler media | ₹ 66,964 | | |
| 9 | Alum and Lime dosing systems | ₹ 110,000 | | |
| 10 | Odor control unit | ₹ 60,000 | | |
| 11 | Mechanical arrangement for oil & grease trap, clarifier | ₹ 525,000 | | |
| 12 | Electromagnetic flow meter | ₹ 223,214 | | |
| | TOTAL OF MECHANICAL ITEMS | ₹ 26,655,610 | | |
| | | | | |
| | ELECTRICAL ITEMS | | | |
| 1 | Diesel Generator | ₹ 840,000 | | |
| | Electrical works, IoT based sensor and control units, | | | |
| 2 | transformer unit | ₹ 4,600,000 | | |
| 3 | Solar units | ₹ 1,830,000 | | |
| | TOTAL OF ELECTRICAL ITEMS | ₹ 7,270,000 | | |
| | ABSTRACT OF COST | | | |
| SI. No. | ITEM | AMOUNT | | |
| 1 | Civil Works | ₹ 526,509,610 | | |
| 2 | Mechanical Works | ₹ 26,655,610 | | |
| 3 | Electrical Works | ₹ 7,270,000 | | |
| 4 | Road restoration charges | ₹ 173,186,813 | | |
| 5 | Household Sewer connection charges @ 16500 | ₹ 33,000,000 | | |
| | GST Component (18%) | ₹ 137,991,966 | | |
| | DPR preparation charge @ 2.5% | ₹ 19,165,551 | | |
| | Centage charges@10% | ₹ 76,662,203 | | |
| | Unforeseen | ₹ 11,168,248 | | |
| | GRAND TOTAL | ₹ 1,011,610,000 | | |
| | Total O&M cost for10 years | ₹ 123,390,000 | | |
| | TOTAL COST including 10 years O&M | ₹ 1,135,000,000 | | |
| Rupees One hundred and thirteen crores fifty lakhs only | | | | |

8.4 CHARGES FOR SEWERAGE HOUSEHOLD CONNECTIONS

The sewerage connections to the household are to be provided in parallel with the construction of STP for the timely commissioning of the plant and an amount of Rs.16500/household has been incorporated in the total estimated cost which comes to Rs.3.30 Crores. In addition to this the concerned ULB shall to bring the septage load to the proposed plant for its full functioning.

CHAPTER 9

OPERATION AND MAINTENANCE

9.1 GENERAL

For the success of a sewerage treatment system, it is inherent to note that meticulous operation and maintenance planning is the key. In the following sections various aspects of effective operation and maintenance, cost analysis, application of modern technologies for monitoring and process control and maintenance of an eco-friendly system are illustrated. In engineering parlance, the term operation refers to the daily operation of the components of a sewerage system such as collection system, sewage pumping stations (SPS), pumping mains, sewage treatment plants (STP), machinery and equipment, etc., in an effective manner by various technical personnel, and is a routine function. The term maintenance refers to the art of keeping the structures, plants, machinery and equipment and other facilities in optimum working order and includes preventive maintenance or corrective maintenance of mechanical adjustments, repairs, and planned maintenance. However, replacements, correction of defects etc., are considered as actions excluded from preventive maintenance.

9.2 PLANNING FOR EFFECTIVE OPERATION AND MAINTENANCE

Three categories of variability that can affect the design, performance and reliability of a wastewater treatment plant are

a] variability of the influent wastewater flow rate and characteristics,

b] inherent variability in wastewater treatment processes and

c] variability caused by mechanical breakdown, design deficiencies and operational failures.

It may be noted that effective use of the equalization facility will balance most of the issues related with the variability of the influent flow rate and abnormal BOD levels at certain points of time. Many of the treatment units exhibit variability in performance despite the efficient planning and design. However, these problems can be eliminated at the design stage itself by adopting some conservative values. At the operational stage, some of the design deficiencies can be addressed by few additions in the system which will not affect the total operational cost. Occurrence of mechanical and electrical breakdown can be addressed by careful planning of maintenance activities. There is a provision for diesel generator back up and solar energy sources also can be relied upon. It is recommended to form an internal monitoring committee for periodical inspection and control of activities related to the function, efficiency and operation of the STP. Operation and maintenance for 10 years is to be performed by the firm who carries out the construction and commissioning of the STP.

9.3 TYPE OF MAINTENANCE

There are three types of maintenance of a sewerage system – preventive, routine and emergency. Preventive or routine maintenance should be carried out to prevent any breakdown of the system and to avoid emergency operations to deal with clogged sewer lines or overflowing manholes or backing up of sewage into a house or structural failure of the system. Preventive maintenance is more economical and provides for reliability in operations of the sewer facilities. Emergency repairs, which would be very rare if proper maintenance is carried out well, also, must be provided for. Proper inspection and preventive maintenance are necessary.

9.4 INSPECTION AND EXAMINATION OF SEWER

Sewer collection systems are intended to be a reliable method of conveying sewage from individual discharge to sewage treatment plants. Inspection and examination are the techniques used to gather information to develop operation and maintenance programmes to ensure that new and existing collection systems serve their intended purposes on a continuing basis. Inspection and testing are necessary to do the following:

- Identify existing or potential problem areas in the collection system,
- Evaluate the seriousness of detected problems,
- Locate the position of problems, and
- Provide clear, concise, and meaningful reports to supervisors regarding problems.

Two major purposes of inspection and examination are to prevent leaks from developing in the sewers and to identify existing leaks so they can be corrected. Due to age, deterioration of the material of the sewer by attack of hydrogen sulphide or other chemicals, settlement of foundations and leaking joints may result in the structural failure of the sewer. It takes a very long time from the onset of the first initial defect to the collapse of the sewer. A crack or a leaking joint will allow subsoil water and soil mixture to enter the sewer causing cavities around it leading to slow settlement of foundation and the eventual collapse of the sewer. Very often soil with water is carried away below the bedding along the length of the sewer. The type of failures often gives a clue to the cause. A shear failure due to faulty foundation or movement of earth is a clean vertical break in the pipe or barrel. Excessive loading, either internally or externally, causes horizontal breaks. Breaks caused by internal pressure leads to cracks in the sewer while external overload causes the top of the pipe to be crushed. Regular inspection of the sewer can pinpoint the sewer that needs to be attended to before there is a complete failure or collapse. For preventing the above serious instances of damages to the sewer system, the maintenance engineer should establish adequate inspection and examination programmes.

9.5 SEWER CLEANING

To operate and maintain a sewer collection system to function as intended, the maintenance engineer should try to strive towards the following objectives:

• Minimize the number of blockages per unit length of sewer, and

• Minimize the number of odour complaints.

For this purpose, sewer-cleaning using hydraulic or mechanical cleaning methods needs to be done on a scheduled basis to remove accumulated debris in the pipe such as sand, silt, grease, roots and rocks. If debris is allowed to accumulate, it reduces the capacity of the pipe and blockage can eventually occur resulting in overflows from the system onto streets, yards and into surface waters. Roots and corrosion also can cause physical damage to sewers.

9.6 PROTECTION OF SEWER SYSTEMS

A sewer may get damaged if other facilities such as water pipe or electric cable work are done beside or at the cross-section of a sewer. Especially, fluctuations due to ground excavation may have a serious impact. To avoid damages of sewer, the maintenance engineer should do the following:

1. Collect all related information about the construction activities which are planned around the sewer location,

2. Advise appropriate construction methods to minimize impact for sewer, and

3. If necessary, request the concerned agencies to adopt the protective measures for sewer prior to the work commencement.

9.7 INSPECTION OF MANHOLES AND APPURTENANCES

Because they are part of the collection system, manholes require the same inspection and attention as the rest of sewer network. When located in streets, these structures are subject to vibrations and pounding by vehicle traffic. Manholes may settle at a different rate than connected sewer, creating cracks in sewer pipe joints. The objectives of manhole inspection are therefore, to determine the proper elevations or grades around the lid, to confirm that the lid is not buried, and to examine structural integrity (look for cracks) of the manhole and its functional capacity. The condition of the pipelines coming into a manhole may be known merely by observing the content and volume of flows from a specific direction. Manhole inspection and examination are made by visually inspecting the condition of the cover and the internal parts. Manhole inspection should be carried out together with the inspection and examination of sewer. It is generally carried out together with the cleaning of the sewer. Before entering any manhole, adequate safety measures should be taken in accordance with stipulations. Safety measures during the work should

be formulated considering traffic safety, oxygen deficiency, poisoning due to toxic gas such as hydrogen sulphide and so on.

9.8 CLEANING OF MANHOLES

Manhole cleaning should be performed by the most appropriate work method that suits the actual conditions of the work location. In manholes at starting point, junction manholes and manholes at sharp curve of sewers, sand and silt get deposited and environmental problems such as foul odours occur. For this reason, periodic cleaning is necessary. Moreover, when large debris flows in, it should be removed immediately otherwise there is a possibility of an overflow accident, float-off and dispersion of cover. Manhole inspection should be generally carried out together with the cleaning of the sewer. The work on the silt and sand in the bottom part should be pursuant to cleaning of the sewer pipe, while the dirt on the sidewall should be cleaned by high-pressure jet washing vehicle.

9.9 SAFTEY PRACTICES

Sewer cleaning is an occupation that has an overall accident frequency rate that is relatively higher than any other industry. The employer has the responsibility of providing the worker with a safe place to work. Nevertheless, the worker has the overall responsibility and must ensure that it is a safe place to work. This can only be done by constantly thinking of safety and working safely. The worker has the responsibility of protecting not only himself, but also all other plant personnel or visitors by establishing safety procedures for the plant and then ensuring they are followed. He must train himself to analyse jobs, work areas and procedures from a safety standpoint and learn to recognize potentiality hazardous actions or conditions. When he recognizes a hazard, he must take immediate steps to eliminate it through corrective action. If correction is not possible, guard against the hazard by proper use of warning signs and devices / by establishing and maintaining safety procedures. As an individual, the supervisor can be held liable for injuries or property damage, which results from an accident caused by his negligence.

9.10 OPERATION AND MAINTENANCE OF LIFT STATIONS

In general, lift stations are invariably used in gravity sewer network where depth of cut of sewers poses a problem in high water prone areas. The procedure is to sink a wet well on the road shoulder or an acquired plot after the shoulder and divert the deeper sewer there. The submersible pump will lift the sewage and discharge it to the next online shallow sewer. This is a very useful practice in such locations. Equipment located in the wet well should be minimized, including suction and discharge valves, check valves, or other equipment that require routine, periodic maintenance.

9.11 OPERATION AND MAINTENANCE OF PUMPING STATIONS

Pumping machinery is subjected to wear & tear, erosion and corrosion due to its nature of functioning, and therefore it is vulnerable to failures. Generally, failures or interruptions are mostly attributed to pumping machinery rather than any other component. Therefore, correct operation and timely maintenance and upkeep of pumping stations and pumping machinery are of vital importance. Sudden failures can be avoided by timely inspection, follow up actions on observations of inspection and planned periodical maintenance. Downtime can be reduced by maintaining inventory of fast moving spare parts. Obviously due attention needs to be paid to all such aspects for efficient and reliable functioning of pumping machinery.

9.11.1 OPERATION OF PUMPS

The following points should be observed while operating the pumps.

A. Dry running of the pumps should be avoided.

B. Centrifugal pumps if installed with negative suction should be primed before starting.

C. Pumps should be operated only within the recommended range of the head-discharge characteristics of the pump.

• If pump is operated at a point away from duty point, the pump efficiency normally reduces.

• Operation near the shut-off point should be avoided, as it causes substantial recirculation within the pump, resulting in overheating of sewage in the casing and consequently, overheating of the pump.

D. As far as possible positive suction is to be provided to avoid priming during design itself.

E. Voltage during operation of the pump-motor set should be within ± 10 % of the rated voltage. Similarly, current should be below the rated current shown on the name plate of the motor.

F. When parallel pumps are to be operated, the pumps should be started and stopped with a time lag between two pumps to restrict change of flow velocity to minimum and to restrict the dip in voltage in the incoming feeder and should be adequate to allow the pump head to stabilise.

G. When the pumps are to be operated in series, they should be started and stopped sequentially, but with minimum time lag. Any pump next in sequence should be started immediately after the delivery valve of the previous pump is even partly opened. Due care should be taken to keep open the air vent of the pump next in sequence, before starting that pump.

H. The stuffing box should allow a drip of leakage to ensure that no air passes into the pump and that the packing gets adequate wetness for cooling and lubrication. When the stuffing box is sealed with grease, adequate refill of the grease should be maintained.

I. The running of duty pumps and standby pumps should be scheduled so that no pump remains idle for a long period and all pumps are in ready-to-run condition. Similarly, the running schedules should be ensured so that all pumps do not wear equally needing simultaneous overhaul.

J. If any undue vibration or noise is noticed, the pump should be stopped immediately and the cause for vibration or noise should be checked and rectified.

K. Generally, the number of starts per hour shall not exceed four. Frequent starting and stopping should be avoided as each start causes overloading of motor, starter, contactor and contacts. Although overloading lasts only for a few seconds, it reduces the life of the equipment.

9.12 SMART MANAGEMENT AND ONLINE MONITORING USING INTERNET OF THINGS (IoT)

Advancement in the field of digital technology has enabled the wastewater treatment system operators and managers to control and enhance the performance of various components of the system. Internet of things (IoT) consists of a network of physical objects using various sensors as end points to enable monitoring from a remote station. For the sewerage treatment plant, a network of various sensors can capture the variations of values of parameters like temperature, dissolved oxygen, chemical composition, TDS etc. at different control points of the system. The continuous data obtained through IoT is used by a customised algorithm for synthesis to impart a decision-making procedure. A centralised information processing system (CIPS) can be formed for this task. In addition to this smart water flow meters can also be coupled to this digital environment. IoT in wastewater management can also be used to calculate residual chemicals after the treatment. This data can be further used to calculate the efficiency of the treatment process and ensure that water quality standards are met before it is discharged in a water body. By using real-time data gathered through different embedded sensors, performance characteristics of machines can be monitored that further increase the productivity of equipment and boost maintenance tasks.

9.13 ODOUR CONTROL METHODS

Odours are a complex combination of a wide variety of compounds; however, there are certain compounds and groups of compounds that contribute specifically to sewage odours, and significantly determine the selection of the control technology. These include the following:

- Hydrogen sulphide, and
- Ammonia.

Odour control is a complex and time-consuming challenge, often requiring a combination of methods for treating odorous gases and for removing or reducing the potential causes of the odours. If an odour problem is severe enough to affect the community, an emergency response and solution to the problem must be carried out quickly. The approach for selecting an odour control method or technology includes the following steps:

A. Identify the odour source and characteristics through sampling and analysis.

B. List and assign priorities to controlling a specific odour problem, recognizing considerations such as cost, plant location, future upgrading of various sewage processes, severity of the odour problem, and the nature of the affected area.

C. Select one or more odour control method or technology for implementation to meet the objectives of steps "a" and "b", taking into consideration the advantages and disadvantages of each.

D. Monitor odour emissions from the treated air for process adjustments and for feedback to evaluate the solution's effectiveness. Hydrogen sulphide (H2 S) is the most common odorous gas found in sewage collection and treatment systems and results from the reduction of sulphate by bacteria under anaerobic conditions. Its characteristic rotten-egg odour is well known. The gas is corrosive, toxic and soluble in sewage. Hydrogen sulphide is considered a broad-spectrum poison, meaning it can poison several different systems in the body.

9.13.1 PREVENTION OF ODOUR

Hydrogen sulphide production can be controlled by maintaining conditions that prevent the build-up of sulphides in the sewage. The presence of oxygen at concentrations of more than 1.0 mg/L in the sewage prevents sulphide build-up because sulphide produced by anaerobic bacteria is aerobically oxidized. Maintaining an aerobic environment inhibits the anaerobic degradation process, which contributes to the generation of hydrogen sulphide. A checklist is given below:

• Prevent corrosion in the collection well of the facility by blowing air through the facility

• Avoid storing screenings and grit generated in the grit chamber for a long time. Dispose of screenings and grit at appropriate intervals

• Retention time of sludge in the sludge treatment facilities should be appropriate (Do not retain sludge for a long time)

• Maintain sewage at neutral pH range because most of the sulphide is present at a pH value of less than 7. Following is a short checklist of operational considerations for controlling odours of primary treatment facilities: (May also apply in other facilities)

• Remove scum routinely, with increased frequency during warm weather.

• Remove sludge before it can bubble or float.

• Wash weirs and other points where floatable and slime collect. Some facilities use submerged pipes with holes rather than effluent troughs. The submerged pipes do not splash the primary effluent, thereby reducing the release of hydrogen sulphide.

• Wash down all spills and grease coatings.

• When draining a tank, immediately flush it completely. If sludge does not drain quickly, spray lime, calcium hypochlorite, or potassium permanganate on the sludge surface to reduce odours. Because even a clean tank can produce odours, flushing the tank with a chlorine solution or keeping the tank floor covered with a low concentration of chlorine solution will reduce odours.

• If the sewage is septic, add chemicals in the collection system or at the plant, as appropriate, to reduce sulphides. • If tanks are covered for odour control, keep plates and access hatches in place.

• Routinely check any odour scrubbers or deodorizers for plugging, adequate supply of chemicals, proper pressures for demisting, and/or effectiveness of carbon.

• The splashing of primary sewage into weir troughs and effluent channels can result in the release of hydrogen sulphide. If possible, try to minimize the splashing of primary sewage into the channel or weirs. If it cannot be accomplished operationally, then installing submerged sewer pipes may be necessary. This will require tank modifications to verify the plant hydraulics and provide proper control to avoid fluctuations in the tank levels.

• Minimize the stripping of hydrogen sulphide from the sewage when using channel air diffuser systems. Adoption of the following regular practices will not only increase removal efficiency but will provide better working conditions for the operator:

• Regularly remove accumulations from the inlet baffles and outlet weirs with a hose or a broom with stiff bristles. Only experience will determine the necessary frequency.

• Clean scum removal equipment regularly; otherwise, obnoxious odours and an unsightly appearance will result.

• Keep cover plates in place except when operations or maintenance require their removal. • Immediately flush and remove all sewage and sludge spills. Avoid hosing down motors and enclosed control devices.

• Establish a housekeeping schedule for the primary treatment area, including galleries, stairwells, control rooms, and related buildings, and assign responsibility for each item to a specific employee. • Repaint surfaces as necessary for surface protection and appearance.

9.13.2 CONTROL OF ODOUR BY CHEMICAL ADDITION

Chemical addition can control odours in STP by preventing anaerobic conditions or controlling the release of odorous substances.

| Chemical | Effective against |
|---------------------------------|---|
| Ozone Oxidisers | Atmospheric hydrogen sulphide only |
| Hydrogen peroxide | Hydrogen sulphide also act as oxygen sourse |
| Chlorine | Hydrogen sulphide and other reduced sulphur compounds |
| Sodium and Calcium hypochlorite | Hydrogen sulphide and other reduced sulphur compounds |
| Potassium permanganate | Hydrogen sulphide and other reduced sulphur compounds |
| Table 0.1 Con | tral of adour by shamical addition |

Table 9.1 Control of odour by chemical addition

9.14 MAINTAINING AN ECO-FRIENDLY SYSTEM

The treated water contains plant nutrients also, it will be beneficial for the environment when discharged as soil infiltration. Care has also been taken to properly treat the sludge produced during the operation. It may also be noted that a septic tank complying with the Indian Standard Code of practice has been designed and given at the initial treatment stage to reduce any shock of load to the biological treatment units. It has also been decided to impart a green environment to the STP units with special methods of growing plants at the exterior of plant components and space between units. Maximum utilisation of space has been taken at the planning and design stage itself and using the natural treatment properties of the soil, such decentralized systems provide good opportunities to use the natural environment. They can help reduce the level of difficulty and cost to treat pollutants, such as nutrients, and keeping them from entering lakes, rivers, and streams. Some aspects of the green landscaping eco-friendly unit management are described below for the proposed STP:

Soil: The soil acts as a natural filter and provides final treatment by removing harmful bacteria, viruses, and nutrients.

Odour management: Special attention is also given to proper odour management by using green belt inspired landscaping and chemical application whenever needed at extreme cases.

Trees: barrier formed with fast growing trees are planned for protection against pollution, for defining boundaries and for assisting in the creation of beautiful landscaping. Some of the plants are Casuarina Equisetifolia, golden bamboo, Grevillea Robusta etc. Shrubs: the use of shrubs in the mass as a basic constituent in the planning of landscape is important. Shrubs with properties of hardiness, vigorous growth and an emphasis on evergreen plants are selected.

Creeping plants for exterior of units: The plants like climbing hydrangea creeps to walls and grow to impart a green environment.

Air purifying plants: Polluted air contains particles, odours and harmful gases like nitrogen oxides, sulphur dioxide and ammonia. These pollutants settle on the leaves of trees and plants. The leaves and plant surface absorb these pollutants and through their stomata (pores) and filter these harmful substances from the air. Trees also trap heat and reduce greenhouse gases in the atmosphere. They also reduce the ground level ozone level and enrich the air around us with life giving oxygen. For combating a variety of respiratory troubles and other illnesses caused by air pollution, there can be no better way than planting some chosen varieties of plants that can cleanse the air and make our environment better. The bamboo palm is a popular purifying houseplant due to its tropical look and insect-repelling quality. The bamboo palm can remove substances like benzene, formaldehyde, chloroform, carbon monoxide, and xylene.

9.15 OCCUPATIONAL HEALTH HAZARDS AND SAFTEY MEASURES

The sanitation workers, engaged in operation and maintenance (O&M) of sewerage system or septic tanks, are exposed to different types of occupational hazards like injuries caused by physical actions, chemicals contacts, infections caused by pathogenic organisms, and dangers inherent with oxygen deficiency, hydrogen sulphide, and combustible gases. The employers are obligated to provide their employees with safety equipment or protective gears as well as cleaning devices and ensure observance of safety precautions appropriate for each hazardous condition to reduce the employees' risks to health and safety. Moreover, to guard against human error and carelessness, proper safety training and adequate effective supervision by safety personnel are most essential. The GOI enacted the "Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993," which declared the employment of scavengers or the construction of dry latrines to be an offence, considering the foregoing, another bill titled "The Prohibition of Employment as Manual Scavengers and their Rehabilitation Bill, 2013" was introduced in the Parliament in September 2013 and has since been passed. The Bill aims to eliminate manual scavenging and insanitary latrines and provides for proper rehabilitation of manual scavengers in alternative occupations so that they can lead a life of dignity. In addition to the Acts mentioned above, employees shall follow "Contract Labour Regulation and Abolition Act, 1970" for secure operational health and safety at their sites. O&M of sewerage facilities, which should not be discontinued at any moment, requires health and safety consciousness equal to or greater than one that is needed for construction projects. In India, "health and safety policy" is defined in construction project management by Bureau of Indian Standard (BIS). Therefore, the same health and safety policy for

construction projects may also be adopted for O&M of sewerage facilities. STPs are subject to safety audits, which confirm the status of safety and health organizational setup, education / training, provision / inspection of personal protection, and records of safety, to ensure occupational safety and health at the work sites. The plant engineer should rectify failures immediately, if any. The audit shall be implemented as per IS: 14489 "Code of Practice on Occupational Safety and Health Audit." Standard safety audit procedures of the inspectorate of factories shall be at a frequency of a month and compliance reported to that agency.

| | OPERATION | & MAINTEN | ANCE (| COSTS | |
|------------|--|------------------------------------|--------|------------|--------------|
| SI. No. | Item | | Unit | | Expenditure |
| 1 | Power Charges for STP @ Rs.5 for kwh @ | 107536 | | kwh/month | ₹ 537,680 |
| 2 | Power Charges for network @ Rs.5 for kwh @ | 17322 | | kwh/month | ₹ 86,611 |
| 3 | Operators rate/month | 25000 | 18 | Nos. | ₹ 450,000 |
| 4 | Unskilled Worker | 8000 | 3 | Nos. | ₹ 24,000 |
| 5 | Chemist | 20000 | 1 | Nos. | ₹ 20,000 |
| 6 | Fuel for generator/month | | | | ₹ 6,000 |
| 7 | Gas Chlorine/month | | | | ₹ 3,500 |
| 8 | Alum and Lime ,polyelectrolyte dosing/month | | | | ₹ 54,329 |
| 9 | Spares and replacements/month | | | | ₹ 5,000 |
| 10 | Network routine inspection, flushing, cleaning including for manholes/month@ | 0.3% of cost of network/year | | | ₹ 38,680 |
| | Total per month | | | | ₹ 1,225,800 |
| | Total per month excluding power charges | | | | ₹ 601,510 |
| | Annual Operation & Maintenance Charge | | | | ₹ 14,709,605 |
| | Annual Operation & Maintenance Charge excluding power charges | | | | ₹ 7,218,114 |
| | Treatment Cost per Day | | | | ₹ 40,300 |
| | Unit Cost of Treatment per Kilo Litre | | | | ₹23 |
| | 10 YEAR ANNUAL O&M COST CON | SIDERING 8% | 5 ANNU | AL INCREAS | E EVERY YEAR |
| Excl | uding power charges | 1 | | | |
| 1 | 1 st year | | | | ₹ 7,218,114 |
| 2 | 2 nd year | | | | ₹ 7,795,563 |

9.16 COST ANALYSIS - OPERATION & MAINTENANCE COSTS

Kerala Water Authority, Sewerage Circle, Kochi

| DER for 1 76 MLD | capacity STP for S | Sewerage Network& | FSSM at Kattapana |
|------------------|--------------------|-------------------|-------------------|
| DERJOI 1.70 MILD | cupucity SII Joi L | seweruge werworka | r som at Kanapana |

| 3 | 3 rd year | ₹ 8,419,208 |
|----|--|---------------|
| 4 | 4 th year | ₹ 9,092,745 |
| 5 | 5 th year | ₹ 9,820,164 |
| 6 | 6 th year | ₹ 10,605,778 |
| 7 | 7 th year | ₹ 11,454,240 |
| 8 | 8 th year | ₹ 12,370,579 |
| 9 | 9 th year | ₹ 13,360,225 |
| 10 | 10 th year | ₹ 14,429,043 |
| | Total O&M cost for 10 years | ₹ 104,565,660 |
| | GST @ 18% | ₹ 18,821,819 |
| | Unforseen Items | ₹ 2,521 |
| | Total O&M cost for 10 years including GST | ₹ 123,390,000 |

CHAPTER - 10 IMPLIMENTATION OF THE PROJECT

10.1 IMPLEMENTING AGENCY

Kerala Water Authority is the responsible agency in Government sector in the water supply sector and sewerage Sector for implementation of Major Projects under various funding agencies AMRUTH, NABARD, Rebuild Kerala, ADB assistance, and also STATE PLAN Works. Being high value projects Implementation of sewerage projects also requires an agency with expertise and having sufficient human resources.

10.2 STEPS TO BE TAKEN WHILE TENDERING.

Conditions should be incorporated in the NIT that detailed field survey and design of network shall be carried out for ascertaining the levels due to road developments if any and in order to accommodate the fact that sewer network design based on gravity flow and accurate levels with Total Station equipment along both sides of road and centre of road is required. Due to limitation of fund and time DGPS survey along one side of the road is only taken in the present proposal. Additional changes required for satisfactory completion of work additional sewer lines required with additional manholes, lifting stations required due to future developments in the scheme area shall also be included in the scope of work while implementing the project. Better and advanced technology for treatment to be considered for STP while implementing the project. Soil investigation of STP site, well sites not carried out as the lands proposed are private lands. Hence detailed soil investigation is to be carried out and type of foundation of the structures to be changed accordingly.

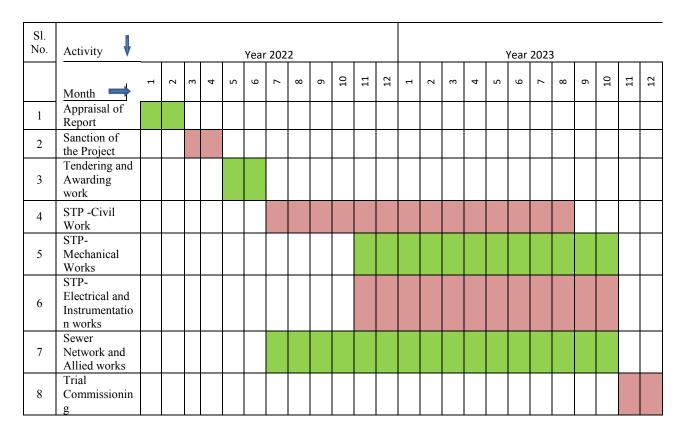
10.3 INTEGRATION WITH OTHER PROJECTS

Planning and design of sewerage schemes can be combined with other water projects. This is since most of these projects are inter-related and environment sensitive. Hence the location of an STP, collection wells and coverage of sewerage networks in an area depends upon the water supply system existing in that area, proximity of irrigation canals, water bodies and flood routing structures if any. Planning shall also be done for integrating with road development projects in the scheme area so as to execute all road reformation works after laying sewerage system.

10.4 SUPPORT ACTIVITIES

It has been observed that in many cases of the implementation of the sewerage projects, public protests are experienced by the implementing agencies and authorities. This is because of the unawareness of the local people about the treatment process, disposal of sludge and re-use of treated sewage etc. In this regard, it is essential to educate the consumers to make them aware of the waste management process

thereby encouraging them to come up with sewerage connections. The state government is promoting the waste management concept in all the possible ways. More support is needed from the Local Self Government Departments, Suchitwa Mission Kerala, Haritha Keralam Mission Kerala and all the other departments by organizing programmers for motivation public through seminars and awareness classes.



10.5 IMPLIMENTATION SCHEDULE

Table 10.1 : Implementation Schedule

Proposed implementation Schedule is provided above. The project is proposed to complete within a period of two years.

CHAPTER - 11 CONCLUSION AND RECOMMENDATION

11.1 CONCLUSION

• The responsibility of providing sewerage systems rest with local bodies which can be facilitated by Kerala Water Authority. KWA has recently set up a Sewerage Vertical with four sewerage circles towards this. The idea and vision behind it are to visualize and materialize complete sewerage schemes for the State as it is vital for a safe environment. Moreover, there are directions from the Honourable National Green Tribunal (NGT) for ensuring the installation of Effluent Treatment Plants (ETPs), Common Effluent Treatment Plants (CETPs), Sewage Treatment Plants (STPs) and other pollution control measures. Hon. NGT has also directed to take necessary action to abate discharge of pollution into rivers (OA No. 673 of 2018).

• This proposal includes 1.76 MLD STP with MBBR technology at Housing board plot near Bypass road in Kattapana Municipality, a sewer network of 27.406 km, 1100 manholes, 5 pumping stations near to SH Convent, St.Martha Convent, Housing board plot, sub treasury, and thovarayar post office and 24 lifting stations. Manholes at 30 m intervals and at all intersections are proposed to facilitate maintenance operations. Septage load from balance area of Kattapana Municipality is proposed to be transported to the 1.76 MLD STP where Co-treatment facility will be provided.

• The cost estimate of the project is excluding land cost. The fund for land has to be provided by the local bodies /Government, according to the source of funding for the scheme.

• If sufficient funds and lands are made available, the projects can be taken up by KWA and can be completed in 2 years. For efficient control of operation and maintenance a monitoring cell at institutional level is to be formed.

• Soil investigation and sewage sample test has to be performed before implementing the project

• For better performance of the system testing of influent samples, effluent samples after treatment from each unit is to be tested at regular intervals and modifications if any shall be made at the initial stage itself so as to ensure efficiency of individual units and effluent standards as per design.

• Better and advanced technology for treatment to be considered for STP while implementing the project.

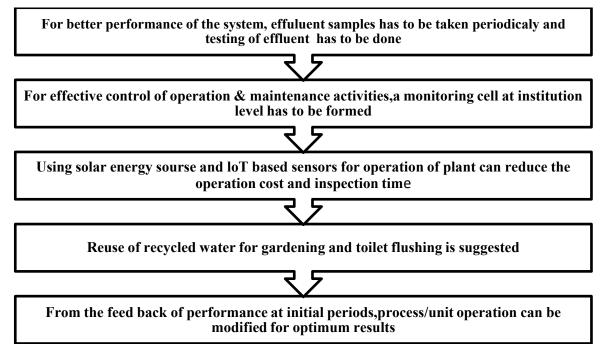
• Sludge generated in the STP must be properly disposed off by transforming it into fertilizer products or bricks for low impact construction activities. Recycled water generated from the STP is to be used as per the guidelines already given. Regarding the positive impacts, it is to be noted that water quality of the

rivers and streams will be greatly improved along with the general environment. The large quantity of recycled water will be useful for multiple purposes including agriculture.

• It may be noted that overall costs (capital and operating) and financial sustainability must be determined to arrive at the most optimum solution. Hence during the detailed engineering survey and investigations stage these factors are to be considered for better performance of the system.

11.2 RECOMMENDATIONS

The success of the system largely depends upon the commitment and attitude of the people benefitted from it and hence it is inherent that the Local Body will investigate every detail of the sewerage treatment plant and its supporting units to render a model of its kind in the State. Some of the points of action to be taken to enhance the performance of the system are outlined as follows:



ANNEXURE – 1

DEATILED ESTIMATE

| CIV | | DETAILED ESTIMATE | OF SE | EWERAG | E SCHEN | AE IN | KATTAPA | NA M | UNICIPALITY | |
|----------------|----------|---|--|---|--|--|--|---|---|---|
| | /IL CO | NSTRUCTION-SEWERAGE 1 | REAT | MENT P | LANT (ST | CP) ,CC | D-TREATN | IENT | UNITS OF SEPT | ГАGE |
| OII | L AND | GREASE TRAP | | | I | | | | | - |
| lte m No | Item | | | | | | | | | |
| | Code | Description | No | L | B | Н | V | Unit | | Amount |
| 1 | 2.6.1 | Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in | on plan |) including | | | | | | |
| | | For oil and grease trap-STP | 1 | 5.3 | 2.9 | 1 | 15.37 | m ³ | | |
| | | For oil and grease trap-CTU | 1 | 2.5 | 1.9 | 1 | 4.75 | m ³ | | |
| | | Total | | | | | 20.12 | m ³ | | |
| | | Do for itemAll kinds of | | | | | | | | |
| | | soil | 0.35 | 20.12 | | | 7.042 | - | 223.41 | 1573.22 |
| | | Do for itemOrdinay rock | 0.35 | 20.12 | | | 7.042 |) | 433.01 | 3049.26 |
| | | Medium rock with blasting | 0.15 | 20.12 | | | 3.018 | @Rs | 541.27 | 1633.54 |
| | | Medium rock with out blasting | 0.15 | 20.12 | | | 3.018 | @Rs | 898.50 | 2711.68 |
| | | | 0.10 | 20.112 | | | 5.010 | 6910 | 0,0.00 | 2,11.00 |
| | | For oil and grease trap-CTU Total | 1 | 2.5 | 1.9 | 0.15 | 0.71 3.02 | | | |
| | | Sau | | | | | 3.02 | 111 | | |
| | 5.37.1 | Say | | 3.02 | m ³ | | | Rs | 7527.06 | 22731.72 |
| | + 5.34.1 | Providing and laying in position Resistant Cement (SRC) content transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of the | ent as p nsit mix cement shutter ccelerat the Eng | nixed M-3 per approver for all l concrete v ing finish gineer retard s | 0 grade co ved desigr eads, havin work, inclu ing and re setting of co harge. (N | n mix, ng cont uding p einforce concrete ote :- | @ for reinford manufactur inuous agita umping of F ement, inclu e, improve v Cement co | Rs ed cen ed in t ted mit t.M.C. ding c vorkab ntent c | nent concrete wor fully automatic b ker, manufactured from transit mixe ost of admixtures ility without impa | rk, using Sulphate batching plant and a sper mix design or to site of laying s in recommended airing strength and |
| | + | Providing and laying in position Resistant Cement (SRC) content transported to site of work in trans of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p | ent as p nsit mix cement shutter ccelerat the Eng | nixed M-3 per approver for all l concrete v ing finish gineer retard s | 0 grade co ved desigr eads, havin work, inclu ing and re setting of co harge. (N | n mix, ng cont uding p einforce concrete ote :- | @ for reinford manufactur inuous agita umping of F ement, inclu e, improve v Cement co | Rs ed cen ed in t ted mit t.M.C. ding c vorkab ntent c | nent concrete wor fully automatic b ker, manufactured from transit mixe ost of admixtures ility without impa | rk, using Sulphate batching plant and a sper mix designer to site of laying s in recommended airing strength and |
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| | + | Providing and laying in position Resistant Cement (SRC) content transported to site of work in trans of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p For oil and grease trap-STP Bottom slab Long wall Short wall | ent as p nsit mix cement shutter ccelerat the Eng er desig | nixed M-3 per appro- er for all l concrete v ing finish re/ retard s gineer-in-c gn mix is p 5.30 | 0 grade co ved design eads, havin work, inclu- ing and re- setting of co harge. (N vayable/rec 2.90 0.25 | n mix, ng cont uding p sinforce concrete ote :- overab | @ for reinforc manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 4.61 | Rs eed cen ed in : ted mi: t.M.C. ding c workab ntent c (). m ³ m ³ | nent concrete wor fully automatic b ker, manufactured from transit mixe ost of admixtures ility without impa | rk, using Sulphate batching plant and a sper mix designer to site of laying s in recommended airing strength and |
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| | + | Providing and laying in position Resistant Cement (SRC) content transported to site of work in trans of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p For oil and grease trap-STP Bottom slab Long wall Short wall For oil and grease trap-CTU Bottom slab | ent as passit mix cement shutter shutter cccelerate the Enguer designed and th | nixed M-3 ber appro- er for all l concrete v ing finish re/ retard s gineer-in-c gn mix is p 5.30 5.00 2.10 2.30 | 0 grade co ved design eads, havin work, inclu ing and re setting of co harge. (N ayable/rec 2.90 0.25 0.25 1.70 | n mix, ng cont uding p concrete overab 0.3 2.25 2.25 0.3 | (@) for reinford manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 4.61 5.63 2.36 1.17 | Rs eed cen eed in a ted mia c.M.C. ding c workab ntent c y). m ³ m ³ m ³ m ³ | nent concrete wor fully automatic b ker, manufactured from transit mixe ost of admixtures ility without impa | rk, using Sulphate batching plant and a sper mix designer to site of laying s in recommended airing strength and |
| | + | Providing and laying in position Resistant Cement (SRC) contu- transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p For oil and grease trap-STP Bottom slab Long wall Short wall For oil and grease trap-CTU Bottom slab Long wall | ent as passit mix cement as passit mix cement shutter shutter ccelerate the Engler designed and the Engler designed at the engle of the | nixed M-3 per approver for all l concrete v ing finish re/ retard s gineer-in-c gn mix is p 5.30 5.00 2.10 2.30 2.00 | 0 grade co ved design eads, havin work, inclu ing and re setting of co harge. (N ayable/rec 2.90 0.25 0.25 1.70 0.25 | n mix, ng cont dding p sinforce concrete overab 0.3 2.25 2.25 0.3 1.50 | @ for reinforce manufactur inuous agita umping of F ement, inclue e, improve v Cement co le separately 4.61 5.63 2.36 1.17 1.5 | Rs eed cen ed in t ted mit c.M.C. ding c workab mtent c p). m ³ m ³ m ³ m ³ m ³ | nent concrete wor fully automatic b ker, manufactured from transit mixe ost of admixtures ility without impa | rk, using Sulphate batching plant and a sper mix designer to site of laying s in recommended airing strength and |
| | + | Providing and laying in position Resistant Cement (SRC) content transported to site of work in trans of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p For oil and grease trap-STP Bottom slab Long wall Short wall For oil and grease trap-CTU Bottom slab | ent as passit mix cement shutter shutter cccelerate the Enguer designed and th | nixed M-3 ber appro- er for all l concrete v ing finish re/ retard s gineer-in-c gn mix is p 5.30 5.00 2.10 2.30 | 0 grade co ved design eads, havin work, inclu ing and re setting of co harge. (N ayable/rec 2.90 0.25 0.25 1.70 | n mix, ng cont uding p concrete overab 0.3 2.25 2.25 0.3 | (@) for reinford manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 4.61 5.63 2.36 1.17 | Rs eed cen ed in t ted mit c.M.C. ding c vorkab ntent c y). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | nent concrete wor fully automatic b ker, manufactured from transit mixe ost of admixtures ility without impa | batching plant and as per mix design er to site of laying s in recommended airing strength and |

| 4 5.37.1 | Providing and laying in position content as per approved design transit mixer for all leads, hav reinforced cement concrete worl centering, shuttering finishing a 9103 to accelerate/ retard setti direction of the Engineer-in-cha used as per design mix is payable | mix, ma ing cont c, include nd reinfo ng of co rge. (Not | anufacture inuous ag ing pumpi orcement, oncrete, in te :- Ceme | d in fully itated mix ng of R.M including mprove w nt content | automa er, ma I.C. from cost of orkabil | atic batching nufactured m transit mi f admixture ity without | g plant as per xer to s s in rec impair | and transported mix design of s site of laying, ex commended prop- ring strength and | to site of work in pecified grade for cluding the cost of ortions as per IS : durability as per |
|---------------|---|---|--|--|---|---|--|--|---|
| | Top slab-STP | 1 | 5 | 2.6 | 0.15 | 1.95 | m ³ | | |
| | Top slab-CTU | 1 | 2.2 | 1.6 | 0.15 | 0.53 | m ³ | | |
| | Total | | | | | 2.48 | | | |
| | Deduction | | | | | | | | |
| | Manhole | 2 | 0.6 | 0.45 | 0.15 | 0.08 | m ³ | | |
| | Total | | | | | 0.08 | | | |
| | Total after deduction | | | | | 2.4 | | | |
| | Say | | 2.4 | m ³ | | | Rs | 10319.09 | 24765.83 |
| 5.22.6 +od | | unt for 1 | | 1 | | | | | a in masitian and |
| 5 16 | binding all complete upto plinth | | | | | | | | ig in position and |
| - | Quantity as per item No.3 | 1 | | 16.32 | | U | kg/m ³ | 1958.40 | kg |
| | Quantity as per item No.4 | 1 | | 2.4 | | | kg/m ³ | 240.00 | , |
| | Total | | | | | | 0 | 2198.40 | - |
| | Say | | 2198.4 | kg | | (a) | Rs | 104.91 | 230632.50 |
| 6 4.12 | Extra for providing and mixing manufacturer's specification. | water p | proofing n | naterial in | cement | t concrete v | vork in | doses by weigh | t of cement as per |
| | Quantity as per item No.3 | 1 | | 16.32 | | 340 | kg/m ³ | 5548.80 | kg |
| | Quantity as per item No.4 | 1 | | 2.4 | m ³ | 330 | kg/m ³ | 792.00 | kg |
| | Total | | | | | | | 6340.80 | kg |
| | Say | | 126.816 | bags | | a | Rs | 70.77 | 8974.13 |
| 7 5.9.1 | Centering and shuttering includ columns, etc. for mass concrete | ling stru | tting, pro | pping etc. | and re | | | or :Foundations, | footings, bases of |
| | Bottom slab-STP | 2 | 8.2 | | 0.3 | 4.92 | | | |
| | Bottom slab-CTU | 2 | 4 | | 0.3 | 2.40 | m ² | | |
| | Total | | | | | 7.32 | m ² | | |
| | Say | | 7.32 | m ² | | a | Rs | 350.00 | 2562.03 |
| 8 5.9.2 | Centering and shuttering includ attached pilasters, butteresses, pl | | | | and re | | | or :Walls (any th | ickness) including |
| | For walls outside-STP | 2 | 7.6 | | 2.25 | 34.2 | | | |
| | For walls inside-STP | 2 | 6.6 | | 2.25 | 29.7 | | | |
| | | | - | 1 | | 10.2 | m^2 | | |
| | For walls outside-CTU | 2 | 3.4 | | 1.5 | | | | |
| | | 2 2 | 3.4 2.4 | | 1.5 1.5 | 7.2 | m ² | | |
| | For walls outside-CTU | | 2.4 | 2 | | 7.2 81.3 | m ² m ² | | |
| | For walls outside-CTU For walls inside-CTU | | | m ² | | 7.2 81.3 | m ² | 748.62 | 60863.04 |
| 9 5.9.3 | For walls outside-CTU For walls inside-CTU Total | 2 | 2.4 81.3 | | 1.5 | 7.2 81.3 @ noval of fo | m ² m ² Rs rm for | | |
| 9 5.9.3 | For walls outside-CTU For walls inside-CTU Total Say Centering and shuttering includ | 2 | 2.4 81.3 | | 1.5 | 7.2 81.3 @ noval of fo | m ² m ² Rs rm for m ² | | |
| 9 5.9.3 | For walls outside-CTU For walls inside-CTU Total Say Centering and shuttering includ balconies and access platform | 2 ing strut | 2.4 81.3 ting, prop | | 1.5 and rer | 7.2 81.3 @ noval of fo 2.28 9.45 | m ² m ² Rs rm for m ² m ² | | |
| 9 5.9.3 | For walls outside-CTU For walls inside-CTU Total Say Centering and shuttering includ balconies and access platform Top slab-STP | 2 ing strut | 2.4 81.3 ting, prop 7.6 | ping etc. | 1.5 and rer | 7.2 81.3 @ noval of fo 2.28 9.45 1.14 | m ² m ² Rs rm for m ² m ² m ² | | |
| 9 5.9.3 | For walls outside-CTU For walls inside-CTU Total Say Centering and shuttering includ balconies and access platform Top slab-STP Bottom portion-STP | 2 ing strut 2 1 | 2.4 81.3 ting, prop 7.6 4.5 | ping etc. | 1.5 and rer 0.15 0.15 | 7.2 81.3 @ noval of fo 2.28 9.45 | m ² m ² Rs rm for m ² m ² m ² m ² | | |

| | Say | | 16.39 | m ² | | a | Rs | 851.52 | 13956. |
|----------|---|---|---|--|---|--|--|---|--|
| | Filling available excavated ear | th (excludi | ng rock) i | n trenches | nlinth | sides of fo | Indatio | ns etc. in lavers i | not exceeding 200 |
| 10 2.25 | in depth, consolidating each de | | | | | | | | |
| | Quantity as per item 1 | 1 | | | | 20.12 | m ³ | | |
| | Deductions | | | | | | | | |
| | PCC | 1 | | | | 3.02 | m ³ | | |
| | Bottom slab | 1 | | | | 16.32 | m ³ | | |
| | Quantity after deductions | 1 | | | | 0.78 | m ³ | | |
| | Say | | 0.78 | m ³ | | @ | Rs | 269.90 | 210. |
| 11 22.23 | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (interr specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engi leakage. For vertical surface tw Inside of walls-STP Inside of walls-CTU Total | of the base eck etc., p d 3 : 1 (3 p hal) side w 0 i.e by d resistant ks up to a neer-in-ch | ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The | er tanks, ro y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm | oof slab in the rational time slut netic fil ity of tic press The wor | os, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on nej ssure on nej ck shall be c nance shall 29.7 7.2 36.9 | reserve (5 part water) : he mat more gative : arried carry g m^2 m^2 | ior, sewage & wa s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete | ater treatment plai lline slurry : 2 pai rfaces and applyi the requirements pared with contri lline slurry shall as per specification years against a |
| 12 22.23 | Say 2 Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engil leakage. For horizontal surface | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-ch | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The | y of hydr er tanks, ro y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | oof slab in the rational time slut netic fill ity of tic press The wor | in nature os, podiums, ttio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne ck shall be c | for wa reserv (5 part water) he mat more gative arried | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com- side. The crystal out all complete | ater treatment plan lline slurry : 2 par rfaces and applyin the requirements pared with contri lline slurry shall as per specification |
| 12 22.23 | 2 Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (interr specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engi leakage. For horizontal surface | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-ch | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg | y of hydr er tanks, re y mixing ii ral crystali lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. | oof slab in the rational time slut netic fill ity of tic press The wor | in nature in nature ss, podiums, ttio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne ck shall be c hance shall | for wa reserv (5 part water) : the mat more gative : arried carry g | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com- side. The crystal out all complete | ater treatment plan lline slurry : 2 par rfaces and applyin the requirements pared with contri lline slurry shall as per specification |
| 12 22.23 | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engi leakage. For horizontal surface Bottom slab inside-STP | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-ch | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg | y of hydr er tanks, ro y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 | oof slab in the rational time slut netic fill ity of tic press The wor | in nature in nature bs, podiums, ttio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne ck shall be c hance shall 9.45 | for wa reserv. (5 part water) : he mat more gative : arried c carry g m ² | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com- side. The crystal out all complete | ater treatment plan lline slurry : 2 par rfaces and applyin the requirements pared with contri lline slurry shall as per specification |
| 12 22.23 | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crac and the direction of the engi leakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-ch | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg | y of hydr er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 | oof slab in the rational time slut netic fill ity of tic press The wor | in nature in nature os, podiums, ttio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne ch shall be c nance shall <u>9.45</u> 1.35 | for wa reserv. (5 part water) : he mat more gative : carry g m^2 m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com- side. The crystal out all complete | ater treatment plan lline slurry : 2 par rfaces and applyin the requirements pared with contri lline slurry shall as per specification |
| 12 22.23 | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engi leakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-ch | lline slurr ment, wat repared by parts integ rith the he reducing to 16 ba width of arge. The @1.10 kg 4.5 1.5 | y of hydr er tanks, rd y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 | oof slab in the rational time slut netic fill ity of tic press The wor | in nature in nature ss, podiums, ttio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne; ck shall be c nance shall 9.45 1.35 10.8 | for wa reserv (5 part water) : the mate mater arried carry g m^2 m^2 m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engi leakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-che cone coat (1 1 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg 4.5 1.5 10.8 | y of hydr er tanks, rc y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² | bof slab in the ra- line slu- netic fil ity of tic pres- the wor- berform | in nature in nature ss, podiums, ttio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne ck shall be c hance shall 9.45 1.35 10.8 @ | for wa reserv. (5 part water) : he mat more gative : arried c carry g m^2 m^2 m^2 m^2 Rs | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engi leakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-che cone coat (1 1 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg 4.5 1.5 10.8 | y of hydr er tanks, rc y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² | bof slab in the ra- line slu- netic fil ity of tic pres- the wor- berform | in nature in nature ss, podiums, ttio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne ck shall be c hance shall 9.45 1.35 10.8 @ | for wa reserv. (5 part water) : he mat more gative : arried c carry g m^2 m^2 m^2 m^2 Rs | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engi leakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-che cone coat (1 1 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg 4.5 1.5 10.8 | y of hydr er tanks, rc y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² | bof slab in the ra- line slu- netic fil ity of tic pres- the wor- berform | in nature in nature ss, podiums, tio of 5 : 2 rry : 1 part - ber brush. T concrete by ssure on ne, ck shall be c hance shall 9.45 1.35 10.8 (1 cemen | for wa reserv. (5 part water) : he mat more gative : arried c carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integ structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engil leakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 12 mm cement plaster finished | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-che cone coat (1 1 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg 4.5 1.5 10.8 | y of hydr er tanks, rc y mixing ii ral crystali lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer | bof slab in the ra- line slu- netic fil ity of tic pres- the wor- berform | in nature in nature is, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne; ssure on ne; k shall be c nance shall 9.45 1.35 10.8 @ :3 (1 cemen 29.7 | for wa reserv. (5 part water) : he mat married carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 12 mm cement plaster finished For STP | of the base eck etc., p d 3 : 1 (3 µ hal) side w 0 i.e by d resistant ks up to a neer-in-cha one coat (1 1 1 with a flo | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg 4.5 1.5 10.8 ating coat | y of hydr er tanks, re y mixing ii ral crystal lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer | oof slab in the ra line slu hetic fil ity of tic pres 'he wor berform ment :1 | in nature in nature ss, podiums, ttio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne ck shall be c nance shall 9.45 1.35 10.8 (a) (1 cemen 29.7 9.45 | for wa reserv. (5 part water) the mater material of carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 an capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 1 12 mm cement plaster finished For STP Inside of walls | of the base eck etc., p d 3 : 1 (3 µ nal) side w 0 i.e by d resistant ks up to a neer-in-chi c one coat (1 1 1 with a flow | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg 4.5 1.5 10.8 ating coat | y of hydr er tanks, ro y mixing ii ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer 2.1 | oof slab in the ra line slu hetic fil ity of tic pres 'he wor berform ment :1 | in nature in nature is, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne; ssure on ne; k shall be c nance shall 9.45 1.35 10.8 @ :3 (1 cemen 29.7 | for wa reserv. (5 part water) the mater material of carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integstructures like retaining walls of tunnels / subway and bridge dwater) for vertical surfaces and the same from negative (internspecified in ACI 212-3R-201 concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 1 2 mm cement plaster finished For STP Inside of walls Base slab inside | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-ch cone coat (1 1 1 with a flor 1 1 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of 1 arge. The @1.10 kg 4.5 1.5 10.8 ating coat 13.2 4.5 | y of hydr er tanks, ro y mixing ii ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer 2.1 | oof slab in the ra line slu hetic fil ity of tic pres 'he wor berform ment :1 | in nature in nature is, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne; ch shall be c nance shall 9.45 1.35 10.8 (<i>i</i>) :3 (1 cemen) 29.7 9.45 18.9 | for wa reserv. (5 part water) = he mat σ more gative = arried of carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 12 mm cement plaster finished For STP Inside of walls Base slab inside Top slab bottom⊤ | of the base eck etc., p d 3 : 1 (3 p nal) side w 0 i.e by d resistant ks up to a neer-in-ch cone coat (1 1 1 with a flor 1 1 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of 1 arge. The @1.10 kg 4.5 1.5 10.8 ating coat 13.2 4.5 | y of hydr er tanks, rr y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer 2.1 2.1 | oof slab in the ra line slu hetic fil ity of tic pres 'he wor berform ment :1 | in nature in nature is, podiums, ttio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne; ck shall be c nance shall 9.45 1.35 10.8 @ :3 (1 cemen 29.7 9.45 18.9 3.6 | for wa reserv. (5 part water) : he mat material gative : arried c carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | 2 Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201) concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 1 12 mm cement plaster finished For STP Inside of walls Base slab inside Top slab bottom⊤ For CTU | of the base eck etc., p d 3 : 1 (3 µ hal) side w 0 i.e by d resistant ks up to a neer-in-cha c one coat (1 1 1 1 with a flow 1 1 2 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of arge. The @1.10 kg 4.5 1.5 10.8 ating coat 13.2 4.5 4.5 | y of hydr er tanks, ro y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cen 2.1 2.1 | ment :1 | in nature in nature ss, podiums, ttio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne ck shall be c nance shall 9.45 1.35 10.8 (<i>i</i>) :3 (1 cemen 29.7 9.45 18.9 (<i>i</i>) 3.6 1.35 | for wa reserv (5 part water) : he mat mater gative : arried of carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | 2 Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201 concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engil leakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 1 12 mm cement plaster finished For STP Inside of walls Base slab inside Top slab bottom⊤ For CTU Inside of walls | of the base eck etc., p d 3 : 1 (3 µ hal) side w 0 i.e by d resistant ks up to a neer-in-ch cone coat (1 1 1 1 1 2 1 2 1 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of ' arge. The @1.10 kg 4.5 1.5 10.8 ating coat 13.2 4.5 4.5 2.4 | y of hydr er tanks, ro y mixing ii ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer 2.1 2.1 0.9 | ment :1 | in nature in nature is, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne; ssure on ne; ck shall be c nance shall 9.45 1.35 10.8 (<i>i</i>) :3 (1 cemen) 29.7 9.45 18.9 3.6 1.35 5.6 | for wa reserv. (5 part water) = he mat gative = arried of carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201) concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 12 mm cement plaster finished For STP Inside of walls Base slab inside Top slab bottom⊤ For CTU Inside of walls Base slab inside Top slab bottom& top Total | of the base eck etc., p d 3 : 1 (3 µ nal) side w 0 i.e by d resistant ks up to a neer-in-ch cone coat (1 1 1 1 2 1 2 1 1 1 1 2 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of 1 arge. The @1.10 kg 4.5 1.5 10.8 ating coat 13.2 4.5 4.5 4.5 4.5 | y of hydr er tanks, ro y mixing ii ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer 2.1 2.1 0.9 | ment :1 | in nature in nature ss, podiums, ttio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne ck shall be c nance shall 9.45 1.35 10.8 (<i>i</i>) :3 (1 cemen 29.7 9.45 18.9 (<i>i</i>) 3.6 1.35 | for wa reserv. (5 part water) = he mat gative = arried of carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | 2 Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201) concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 1 12 mm cement plaster finished For STP Inside of walls Base slab inside Top slab bottom⊤ For CTU Inside of walls Base slab inside Top slab bottom& top Top slab bottom& top | of the base eck etc., p d 3 : 1 (3 µ nal) side w 0 i.e by d resistant ks up to a neer-in-ch cone coat (1 1 1 1 2 1 2 1 1 1 1 2 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of 1 arge. The @1.10 kg 4.5 1.5 10.8 ating coat 13.2 4.5 4.5 4.5 4.5 | y of hydr er tanks, ro y mixing ii ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer 2.1 2.1 0.9 | ment :1 | in nature in nature is, podiums, tio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne ssure on ne ck shall be c nance shall 9.45 1.35 10.8 (<i>i</i>) :3 (1 cemen 29.7 9.45 18.9 3.6 1.35 5.6 68.6 | for wa reserv. (5 part water) the mater material of the material gative to a arried of the material m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |
| | Providing and applying integs structures like retaining walls of tunnels / subway and bridge d water) for vertical surfaces and the same from negative (intern specified in ACI 212-3R-201) concrete as per DIN 1048 and capable of self-healing of crace and the direction of the engileakage. For horizontal surface Bottom slab inside-STP Bottom slab inside-CTU Total Say 12 mm cement plaster finished For STP Inside of walls Base slab inside Top slab bottom⊤ For CTU Inside of walls Base slab inside Top slab bottom& top Total | of the base eck etc., p d 3 : 1 (3 µ nal) side w 0 i.e by d resistant ks up to a neer-in-ch cone coat (1 1 1 1 2 1 2 1 1 1 1 2 | lline slurr ment, wat repared by parts integ vith the he reducing t to 16 ba width of 1 arge. The @1.10 kg 4.5 1.5 10.8 ating coat 13.2 4.5 4.5 4.5 4.5 | y of hydr er tanks, ro y mixing ii ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 2.1 0.9 m ² of neat cer 2.1 2.1 0.9 m ² | ment :1 | in nature in nature is, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne; ssure on ne; ck shall be c nance shall 9.45 1.35 10.8 (<i>i</i>) :3 (1 cemen) 29.7 9.45 18.9 3.6 1.35 5.6 | for wa reserv (5 part water) : he mat y more gative : arried of carry g m^2 | ior, sewage & was s integral crystal for horizontal sur- erial shall meet than 90% com side. The crystal out all complete guarantee for 10 458.77 | ater treatment pla lline slurry : 2 pa: rfaces and applyi the requirements pared with contr lline slurry shall as per specification years against a |

| 1 | | | | | | | | 2 | | |
|-----|-------------|--|--|--|---|---|---|--|---|---------------------|
| | | Total after deduction | | | | | 68.06 | m² | | |
| | | Say | | 68.06 | | |) | Rs | 418.79 | 28502.66 |
| 14 | 19.18. 1 | Supplying and fixing C.I. cover we the cover to be not less than 23 kg | | frame for | manholes | :455x6 | 10 mm recta | ngular | C.I. cover (light o | luty) the weight of |
| | | | 2 | | | | 1 | No. | | |
| | | Say | | 2 | No. | | (a) | Rs | 1629.51 | 3259.01 |
| | | Providing orange colour safety for | ot rest c | | | ick pla | stic encapsu | lated as | s per IS: 10910 | |
| 15 | 19.16 | on 12 mm dia steeel bar conformi over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical in permanent identification mark to 30x20x15 cm cement concrete ble nominal size) Complete as per den | and wid on top n tail ler resistand be visib ock 1:3: | th as 165 surface by ngth on 13 ce test as p le even aff | mm with a ribbing o 8 mm as p per specific ter fixing i | minimu r chequ er stand cations ncludir | Im 112 mm s lering beside dard drawing and having ing fixing in 1 | space b es neces g and s manufa nanhol | etween ssary and uitable to with ctures es with | |
| | | For STP | 6 | | | | 6 | No. | | |
| | | For CTU | 3 | | | | 3 | No. | | |
| | | Say | | 9 | No. | | a | Rs | 568.88 | 5119.92 |
| 16 | 100.36 | Filling water with 5000 litre tanks (average) to the reservoir site and 5 HP diesel engine pump set , hire complete. | pumpir | ng the wate | er into the | reservo | oir of height | not less | s than 3 m using | |
| | | For STP | 1 | 5 | 2.1 | 2.25 | 23.625 | m3 | | |
| | | For CTU | 1 | 1.5 | 0.9 | 1.5 | 2.025 | | | |
| | | Say | | 25.65 | Kilo litre | | a | Rs | 218.95 | 5615.99 |
| | | Total-Oil and Grease Trap | | | | | | | | 612887.93 |
| REC | CEIVIN | IG CHAMBER | | | | | | | | |
| 1 | 2.6.1 | Earth work in excavation by meel 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in | on plan | | | | lisposal of e | xcavat | | |
| | | For receiving chamber-STP | 1 | 4.1 | 2.7 | 1 | 11.07 | | | |
| | | For receiving chamber-CTU | 1 | 1.8 | 1.45 | 1 | 2.61 | | | |
| | | Total | | | | | 13.68 | m ³ | | |
| | | Do for itemAll kinds of soil | 0.5 | 13.68 | | | 6.84 | @Rs | 223.41 | 1528.09 |
| | | Do for itemOrdinay rock | 0.3 | 13.68 | | | 4.104 | @Rs | 433.01 | 1777.08 |
| | | Medium rock with blasting | 0.1 | 13.68 | | | 1.368 | @Rs | 541.27 | 740.45 |
| | | Medium rock with out blasting | 0.1 | 13.68 | | | 1.368 | @Rs | 898.50 | 1229.15 |
| | | | | | | | | | | |
| 2 | 4.1.6 | Providing and laying in position work up to plinth level : 1:3:6 (1) | | | | | graded stor | ne aggr | | |
| | | For receiving chamber-STP | 1 | 4.1 | 2.7 | 0.15 | | | | |
| | | For receiving chamber-CTU | 1 | 1.8 | 1.45 | 0.15 | 0.39 | | | |
| | | Total | | | | | 2.05 | | | |
| | | Say | | 2.05 | m ³ | | <i>(a)</i> | Rs | 7527.06 | 15430.47 |

| | Providing and laying in position Resistant Cement (SRC) con | tent as p | per appro | ved desig | n mix, | manufactur | ed in t | fully automatic b | patching plant an |
|-----------------------|---|-----------|-----------|----------------|----------------|---------------|-------------------|--|---|
| | transported to site of work in tra | | | | | | | | |
| | of specified grade for reinforced | | | | | | | | |
| 5 27 1 | excluding the cost of centering proportions as per IS : 9103 to | | | | | | | | |
| +5.34 | | | | | | | | | |
| 3 1 | $kg/^{3}$.Excess/less cement used as | - | - | | | | | in the second se | |
| - | For receiving chamber-STP | <u> </u> | <u> </u> | | | | | | |
| | Bottom slab | 1 | 4.10 | 2.70 | 0.3 | 3.32 | m ³ | | |
| | Long wall | 2 | 3.50 | | 1.70 | | | | |
| | Short wall | 2 | 1.60 | | - | | | | |
| | For receiving chamber-CTU | | | | | | | | |
| | Bottom slab | 1 | 1.60 | 1.25 | 0.3 | 0.6 | m ³ | | |
| | Long wall | 2 | 1.30 | | | | | | |
| | Short wall | 2 | 0.45 | | | | | | |
| | Total | | 0.10 | 0.20 | 1.50 | 9.44 | | | |
| | Say | | 9.44 | m ³ | | | Rs | 10404.79 | 98221.2 |
| - | Suy | | ,,,,, | | | U. | 10 | 1010107 | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |
| | Providing and laying in positio | n ready | mixed M- | 25 grade | concret | te for reinfo | rced co | ement concrete w | vork, using cemei |
| | content as per approved design | | | | | | | | |
| | transit mixer for all leads, hav | | | | | | | | |
| | reinforced cement concrete wor | | | | | | | | |
| | centering, shuttering finishing a | | | | | | | | |
| | 9103 to accelerate/ retard sett | | | | | | | | |
| | direction of the Engineer-in-cha | | | | consid | lered in this | item is | @ 330 kg/ cum. | Excess/less cemer |
| 4 5.37.1 | used as per design mix is payabl | e/recove | 1 | 1 | | | 3 | | |
| | Top slab-STP | 1 | 3.5 | | | | | | |
| | Top slab-CTU | 1 | 1.5 | 1.15 | 0.15 | | | | |
| | Total | | | | | 1.36 | m | | |
| | Deduction | | | | | | 3 | | |
| | Manhole | 2 | 0.6 | 0.45 | 0.15 | | | | |
| | Total | | | | | 0.08 | | | |
| | Total after deduction | | | 2 | | 1.28 | | | |
| | Say | | 1.28 | m | | a | Rs | 10319.09 | 13208.4 |
| 5.22.6 +OD 5 16 | Epoxy coated steel reinforcem binding all complete upto plinth | | | | | | | | ng in position an |
| | Quantity as per item No.3 | 1 | | 9.44 | m ³ | 120 | kg/m ³ | 1132.80 | kg |
| | Quantity as per item No.4 | 1 | | 1.28 | m ³ | 100 | kg/m ³ | 128.00 | kg |
| | Total | | | | | | | 1260.80 | kg |
| | Say | | 1260.8 | kg | | a | Rs | 104.91 | 132269.5 |
| 6 4.12 | Extra for providing and mixing manufacturer's specification. | g water p | | | cemen | | | doses by weigh | t of cement as pe |
| | Quantity as per item No.3 | 1 | | 9.44 | m ³ | 340 | kg/m ³ | 3209.60 | kg |
| | Quantity as per item No.4 | 1 | | 1.28 | | | kg/m ³ | 422.40 | - |
| | Total | | | | | | Ū | 3632.00 | - |
| | Say | | 72.64 | bags | | a. | Rs | 70.77 | 5140.3 |
| 7 5.9.1 | Centering and shuttering inclu- columns, etc. for mass concrete | ding stru | | | and r | | | | |
| , 5.7.1 | Bottom slab-STP | 2 | 6.8 | | 0.3 | 4.08 | m ² | | |
| | Bottom slab-CTU | 2 | | | 0.3 | | | | |
| | Total | 2 | 2.03 | | 0.5 | 5.79 | m ² | | |
| | | | 1 | 1 | 1 | I 3.79 | *** | 1 | 1 |

| | Say | | 5.79 | m ² | | @ | Rs | 350.00 | 2026.52 |
|-----------|--|---|--|---|--|---|--|---|---|
| | Centering and shuttering includ | ing stru | tting, pro | pping etc. | and re | emoval of f | orm fo | or :Walls (any thi | ickness) including |
| 8 5.9.2 | attached pilasters, butteresses, pl | - | | | | | | | , 2 |
| | For walls outside-STP | 2 | 5.6 | | 1.7 | 19.04 | | | |
| | For walls inside-STP | 2 | 4.6 | | 1.7 | 15.64 | m ² | | |
| | For walls outside-CTU | 2 | 2.25 | | 1.35 | 6.075 | m ² | | |
| | For walls inside-CTU | 2 | 1.25 | | 1.35 | 3.375 | | | |
| | Total | | | | | 44.13 | m ² | | |
| | Say | | 44.13 | m ² | | <i>a</i> | Rs | 748.62 | 33036.73 |
| 9 5.9.3 | Centering and shuttering includi balconies and access platform | ing strut | ting, prop | ping etc. | and rer | noval of for | rm for | :Suspended floor | s, roofs, landings |
| | For STP | | | | | | | | |
| | Top slab | 2 | 5.6 | | 0.15 | 1.68 | m ² | | |
| | Bottom portion | 1 | 3 | 1.6 | 0.15 | 4.8 | | | |
| | For CTU | 1 | 5 | 1.0 | | 1.0 | | | |
| | Top slab | 2 | 2.25 | | 0.15 | 0.675 | m ² | | |
| | Bottom portion | 1 | 1.3 | 0.95 | 0.10 | 1.235 | | | |
| | Total | | 1.5 | 0.75 | | 8.39 | | | |
| | Say | | 8.39 | m^2 | | | Rs | 851.52 | 7144.21 |
| | | | | | | | | | |
| | Filling available excavated earth | | | | | | | | |
| 10 2.25 | in depth, consolidating each depo | osited lag | yer by ram | ming and | waterin | | _ | and lift upto 1.5 n | n. |
| | Quantity as per item 1 | 1 | | | | 13.68 | m | | |
| | Deductions | | | | | 2.05 | 3 | | |
| | PCC | 1 | | | | 2.05 | | | |
| | Bottom slab | 1 | | | | 3.92 1.28 | | | |
| _ | Top slab | 1 | | | | | | | |
| _ | Quantity after deductions | 1 | 6.42 | | | 6.43 | | 2(0.00 | 1525.4 |
| | Say | | 6.43 | m | | a | Rs | 269.90 | 1735.44 |
| 11 22.23. | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine l leakage. For vertical surface two | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-ch | ment, wat repared by parts integ with the he reducing t to 16 ba width of arge. The | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slat n the ra line slu netic fil lity of tic pres | os, podiums, atio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on neg ck shall be c | reservi (5 part water) t he mat more gative s arried o | ior, sewage & wat s integral crystall for horizontal surf erial shall meet th than 90% comp side. The crystall out all complete a | ter treatment plant, ine slurry : 2 parts faces and applying he requirements as ared with control ine slurry shall be s per specification |
| 11 22.23. | Inside of walls-STP | 2 | 4.6 | | 1.7 | 15.64 | m ² | | |
| | Inside of walls-CTU | 2 | 1.25 | | 1.35 | 3.375 | | | |
| | Total | | 1.23 | | 1.55 | 19.015 | | | |
| | Say | | 19.015 | m ² | | | Rs | 595.28 | 11319.16 |
| | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal | the base k etc., p 3 : 1 (3 j) side w | lline slurr ment, wat repared b parts integ vith the he | y of hydr er tanks, ro y mixing in ral crystall lp of synth | bof slat n the ra line slu netic fil | os, podiums, atio of 5 : 2 rry : 1 part ber brush. T | reservi (5 part water) f he mat | ior, sewage & wat s integral crystall for horizontal surf | ter treatment plant ine slurry : 2 parts faces and applying ne requirements as |

| Т | | For STP | | | | | | | | |
|--|-------------|--|--|--|--|---|--|--|---|--------------------------------------|
| + | | | 1 | 3 | 1.6 | | 1 9 | m ² | | |
| + | | Bottom slab inside Inside walls | 1 | 8 | 1.0 | 2.25 | | m2 | | |
| + | | For CTU | 1 | 0 | | 2.23 | 10 | III2 | | |
| | | Bottom slab inside | 1 | 0.8 | 0.45 | | 0.36 | m ² | | |
| | | Inside walls | 1 | 1.25 | 0.45 | 1.35 | 1.69 | | | |
| | | Total | 1 | 1.23 | | 1.55 | 24.8475 | | | |
| + | | Say | | 24.8475 | m^2 | | | Rs | 458.77 | 11399.2 |
| 13 1 | 13.7.1 | 12 mm cement plaster finished w | vith a flo | | | nent ·1 |)) | | | 11377.2 |
| 1.5 1 | 13.7.1 | For STP | 101 0 110 | ating cout | | nent .1 | | | le sund) | |
| - | | Inside of walls | 2 | 4.6 | | 1.7 | 15.64 | m ² | | |
| - | | Base slab inside | 1 | 3 | 1.6 | 1.7 | 4.8 | | | |
| - | | Top slab bottom | 1 | 3 | 1.6 | | | m ² | | |
| ╉ | | For CTU | | 5 | 1.0 | | 1.0 | | | |
| - | | Inside of walls | 2 | 1.25 | | 1.35 | 3.375 | m ² | | |
| - | | Base slab inside | 1 | 0.8 | 0.45 | 1.50 | 0.36 | m ² | | |
| - | | Top slab bottom | 1 | 1.3 | 0.95 | | 1.235 | | | |
| - | | Total | - | 1.0 | 0.70 | | 30.21 | | | |
| - | | Deduction | | | | | | | | |
| - | | Manhole | 2 | 0.6 | 0.45 | | 0.54 | m ² | | |
| | | Total | | | | | 0.54 | | | |
| | | Total after deduction | | | | | 29.67 | | | |
| | | Say | | 29.67 | m^2 | | | Rs | 418.79 | 12425.4 |
| | 19.18. 1 | Supplying and fixing C.I. cover the cover to be not less than 23 k | | frame for | | 455x6 | | ngular No. | C.I. cover (light d | uty) the weight |
| 1 14 1 | | | g | | | 455x6 | 1 | - | C.I. cover (light du | uty) the weight of 3259.0 |
| 14 1 | | the cover to be not less than 23 k Say Providing and fixing uPVC pipe | g 2 es & fitt | 2 ings includ | manholes : No. dings joint | ing of | 1 @ pipes with | No. Rs | 1629.51 p uPVC solvent co | 3259.0 |
| | | the cover to be not less than 23 k Say | g 2 es & fitt | 2 ings includer in Char | manholes : No. dings joint | ing of | 1 @ pipes with Kgf/cm²- fo | No. Rs one ste r vent j | 1629.51 p uPVC solvent co | 3259.0 |
| 14 1 | | the cover to be not less than 23 k Say Providing and fixing uPVC pipe | g 2 es & fitt | 2 ings includ | manholes : No. dings joint | ing of | 1 @ pipes with Kgf/cm ² - fo 0.45 | No. Rs one ste r vent j m | 1629.51 p uPVC solvent co | 3259.0 |
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| te | | ANNEL | | | | | | | |
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| n Item | | | | | | | | | |
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| | Earth work in excavation by me | | | | | | | | |
| | 1.5 m in width as well as 10 squ 1.5 m, as directed by Engineer- | - |) including | g getting o | ut and o | disposal of e | excavat | ed earth lead upto | 50 m and lift upto |
| 1 2.6.1 | , | ini-charge | 1 | r | | 1 | 3 | 1 | |
| | For grit seperator | 1 | 3.6 | 3.6 | 0.75 | 9.72 | m' | | |
| | For fine screen channel-STP | 1 | 7.25 | 2.25 | 0.50 | 8.16 | m3 | | |
| | For coarse screen channel-STP | 1 | 5.7 | | 0.50 | 9.26 | | | |
| | For screen channel-CTU | 1 | 3 | | 1.00 | 4.35 | | | |
| | Total | - | 5 | 1.15 | 1.00 | 31.49 | | | |
| | Say | | 31.49 | m ³ | | | Rs | 223.41 | 7035.03 |
| | | | | | | 0 | | | |
| | Providing and laying in position | | | - | - | - | | - | - |
| 2 4.1.6 | work up to plinth level : 1:3:6 (For grit seperator | I Cement | | 1 | | | | egate 40 mm non | ninal size) |
| _ | For grit seperator For fine screen channel-STP | 1 | 3.6 | | | | m | | |
| | For coarse screen channel-STP | 1 | 7.25 | | - | 3.21 2.52 | m ³ | | |
| | For screen channel-CTU | 1 | 5.7 | | 0.15 | 0.65 | | | |
| | Total | 1 | 3 | 1.45 | 0.15 | 8.32 | | | |
| _ | Say | - | 8.32 | m ³ | | | Rs | 7527.06 | 62625.15 |
| | | | 0.52 | m | | u | 13 | 1521.00 | 02023.13 |
| 5.37. | | ntent as pransit mix ansit mix ad cement g, shutter accelera | per appro- er for all l concrete ing finish te/ retard s | ved design eads, havi work, inclu- ing and re- setting of e | n mix, ng cont uding p einforce concret | manufactur inuous agita umping of H ement, inclu e, improve | ed in ited mi R.M.C. iding c workat | fully automatic le xer, manufactured from transit mixe ost of admixture pility without imp | batching plant and as per mix design er to site of laying s in recommended airing strength and |
| + | Resistant Cement (SRC) cot transported to site of work in th of specified grade for reinforce excluding the cost of centerin | ntent as p ransit mix ed cement g, shutter accelerat f the Eng | er appro er for all l concrete ing finish te/ retard s gineer-in-c | ved design eads, havi work, inclu- ing and re- setting of e charge. (N | n mix, ng cont uding p einforce concret ote :- | manufactur inuous agita umping of H ement, inclu e, improve Cement co | ed in ited mi R.M.C. iding c workat ntent o | fully automatic le xer, manufactured from transit mixe ost of admixture pility without imp | batching plant and as per mix design er to site of laying s in recommended airing strength and |
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| + | Resistant Cement (SRC) contransported to site of work in the of specified grade for reinforce excluding the cost of centerin 1 proportions as per IS : 9103 to durability as per direction of 1 kg/ ³ .Excess/less cement used as | ntent as p ransit mix ed cement g, shutter accelerat f the Eng | er appro er for all l concrete ing finish te/ retard s gineer-in-c | ved design eads, havin work, inclu- ing and re- setting of e- charge. (N- payable/rec- | n mix, ng cont uding p einforce concret ote :- | manufactur inuous agita umping of H ement, inclu e, improve Cement co le separately 3.89 | ed in tted mit R.M.C. tding c workab ntent of γ). m ³ | fully automatic le xer, manufactured from transit mixe ost of admixture pility without imp | batching plant and as per mix design er to site of laying s in recommended airing strength and |
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| + | Resistant Cement (SRC) cortransported to site of work in the of specified grade for reinforce excluding the cost of centerin 1 proportions as per IS : 9103 to durability as per direction of kg/ ³ .Excess/less cement used as For grit seperator Bottom slab Walls Total Deduction Manhole Total Total after deduction Say For coarse screen channel Bottom slab Walls Total Total after deduction Say For coarse screen channel Bottom slab Wall Say For fine screen channel Bottom slab-STP Bottom slab-CTU Say | ntent as parasit mix ansit mix d cement g, shutter accelera f the Eng per desig per desig per desig 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 1 2 1 | per approver for all l concrete v ing finish te/ retard s gineer-in-c gn mix is p 3.60 5.50 3.00 0.6 10.70 4.70 1.00 6.55 2.80 | ved design eads, havi work, inclu- ing and re- setting of d charge. (No- payable/rec- 3.60 0.25 3.00 0.45 0.45 0.45 0.25 0.25 0.25 0.25 0.25 | n mix, ng cont uding p einforce concret ote :- ovverab 0.30 0.15 0.15 0.15 0.30 1.70 1.50 0.30 | manufactur inuous agita umping of I ement, inclu e, improve v Cement co le separately 3.89 5.5 1.35 10.74 0.04 0.04 0.04 10.7 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0 | ed in tted mi X.M.C. ding c workab ntent o y). m ³ m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ | fully automatic texer, manufactured from transit mixed ost of admixture ility without imp considered in the | patching plant an d as per mix desig er to site of laying s in recommende airing strength an is item is @ 33 |

| | | 2 | 0.95 | 0.25 | 0.90 | 0.43 | | | |
|---------|---|----------|------------|----------------|----------------|--------------|-------------------|-------------------|----------------------|
| | Top slab-fine screen STP | 2 | 6.55 | 2.25 | 0.30 | 8.84 | | | |
| | Top slab-Course screen -STP | 2 | 5.00 | 2.25 | 0.30 | 6.75 | | | |
| | Top slab-CTU | 1 | 2.80 | 1.25 | 0.30 | 1.05 | | | |
| | Total | | | | | 35.87 | | | |
| | Say | | 35.87 | m ³ | | | Rs | 10404.79 | 373219.83 |
| 5.22.6 | ~~) | | | | | 0 | | | |
| +OD1 | Epoxy coated steel reinforcement | | | | | | | | ng in position and |
| 4 6 | binding all complete upto plinth le | evel. Th | ermo-Mec | | | - | | | |
| | Quantity as per item No.3 | 1 | | 46.57 | m' | 120 | kg/m ³ | 5588.40 | - |
| | Total | | | | | | | 5588.40 | kg |
| | Say | | 5588.4 | kg | | a | Rs | 104.91 | 586274.85 |
| 5 4.12 | Extra for providing and mixing manufacturer's specification. | water p | proofing n | naterial in | cement | t concrete v | vork in | doses by weigh | t of cement as per |
| | Quantity as per item No.3 | 1 | | 46.57 | m ³ | 340 | kg/m ³ | 15833.80 | kg |
| | Total | | | | | | | 15833.80 | kg |
| | Say | | 316.676 | bags | | (a) | Rs | 70.77 | 22409.58 |
| 6 5.9.1 | Centering and shuttering includi columns, etc. for mass concrete | ing stru | tting, pro | pping etc. | and re | emoval of f | form fo | or :Foundations, | footings, bases of |
| | Bottom slab-grit seperator | 2 | 7.2 | | 0.30 | 4.32 | m ² | | |
| | STP Bottom slab-coarse screen | | | | | | 2 | | |
| _ | channel | 2 | 14.5 | | 0.30 | 8.70 | m ² | | |
| | STP Bottom slab-fine screen channel | 2 | 17.6 | | 0.30 | 10.56 | | | |
| | CTU Bottom slab-screen | | | | | | | | |
| | channel | 1 | 8.1 | | 0.30 | 2.43 | m^2 | | |
| | Total | | | | | 26.01 | m ² | | |
| | Say | | 26.01 | m ² | | a | Rs | 350.00 | 9103.60 |
| 7 5.9.2 | Centering and shuttering includi attached pilasters, butteresses, pli | - | | | and re | | | or :Walls (any th | ickness) including |
| | For walls outside-grit seperator | 2 | 6.00 | | 2.00 | 24.00 | | | |
| | For walls inside-grit seperator | 2 | 5.00 | | 2.00 | 20.00 | m ² | | |
| | For STP | | | | | | | | |
| | For walls inside-coarse channel | 2 | 5.65 | | 1.70 | 19.21 | | | |
| | For walls outside-coarse channel | 2 | 6.20 | | 1.70 | 21.08 | | | |
| | For walls outside-fine channel | 2 | 7.25 | | 1.50 | 21.75 | m ² | | |
| | For walls inside- fine channel | 2 | 6.50 | | 1.50 | 19.50 | | | |
| | For CTU-Wall outside-channel | 2 | 2.45 | | 0.90 | 4.41 | | | |
| | For CTU-Wall inside-channel | 2 | 3.45 | | 0.90 | 6.21 | | | |
| | Total | | | | | 136.16 | m ² | | |
| | Say | | 136.16 | m ² | | | Rs | 748.62 | 101932.50 |
| 8 5.9.3 | Centering and shuttering including balconies and access platform | ng strut | ting, prop | ping etc. | and ren | noval of for | rm for | :Suspended floo | rs, roofs, landings, |
| | Top slab-grit seperator | 2 | 6.0 | | 0.15 | 1.80 | m ² | | |
| | Bottom portion-grit seperator | 1 | 2.50 | 2.5 | | 6.25 | m ² | | |
| | Top slab -course screen channels STP | 1 | 11.40 | | 0.15 | 1.71 | | | |
| | Bottom portion-course screen | | | | | 5.88 | | | |

| | Top slab -fine screen channels | | | | | | | | |
|----------|--|---|--|---|--|--|--|--|---|
| | STP | 1 | 14.50 | | 0.15 | 2.18 | m ² | | |
| | Bottom portion-fine screen | | | | | | | | |
| | channels STP | 1 | 6.25 | 1.25 | | 7.81 | m ² | | |
| | Top slab - screen channels CTU | 1 | 3.45 | | 0.15 | 0.52 | | | |
| | Bottom portion-screen channels | | | | | | | | |
| | CTU | 1 | 2.50 | 0.95 | | 2.38 | | | |
| | Total | | | 2 | | 28.52 | | | |
| | Say | | 28.52 | m ² | | a | Rs | 851.52 | 24280.96 |
| | Providing and applying integra structures like retaining walls of tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a | ment, wat repared by parts integ rith the he reducing to 16 ba width of | er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T | oof slab n the ra line slu netic fil lity of tic pres | os, podiums, tio of 5 : 2 rry : 1 part o per brush. T concrete by ssure on neg k shall be c | reserv (5 part water) The mat more gative arried | ior, sewage & wat s integral crystall for horizontal surf erial shall meet th than 90% comp side. The crystall out all complete a | ter treatment plant, ine slurry : 2 parts faces and applying ne requirements as ared with control ine slurry shall be s per specification |
| 9 22.23 | 3.1 leakage. For vertical surface two | | | | | | | | |
| | Inside of walls-grit seperator | 2 | 5 | | 2.00 | 20 | m ² | | |
| | Inside of walls-Course screen channels STP | 2 | 5.95 | | 1.70 | 20.23 | | | |
| | Inside of walls-Fine screen | | | | | | 2 | | |
| | channels STP | 2 | 7.5 | | 1.50 | 22.5 | | | |
| _ | | | | | | | | | |
| | Total | | | 2 | | 62.73 | | | |
| | Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge decl | the base k etc., p | ment, wat repared by | y of hydr er tanks, ro y mixing in | oof slab n the ra | (a) in nature os, podiums, itio of 5 : 2 | Rs for wa reserv (5 part | ior, sewage & wat s integral crystall | ter treatment plant, ine slurry : 2 parts |
| | Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha | lline slurr ment, wat repared by parts integ rith the he reducing to 16 ba width of arge. The | y of hydr er tanks, re y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | oof slab n the ra line sluu netic fil lity of tic pres | <i>(a)</i> in nature is, podiums, tio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg k shall be c | Rs for wa reserv (5 part water) The mat gative arried | terproofing treats ior, sewage & wat s integral crystall for horizontal surf erial shall meet th than 90% comp side. The crystall out all complete a | ment to the RCC ter treatment plant, ine slurry : 2 parts aces and applying the requirements as ared with control ine slurry shall be s per specification |
| 10 22.23 | Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine 3.2 leakage. For horizontal surface on | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha | lline slurr ment, wat repared by parts integ with the he reducing to 16 ba width of arge. The @1.10 kg | y of hydr er tanks, ro y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. | oof slab n the ra line sluu netic fil lity of tic pres | <i>(a)</i> in nature is, podiums, tio of 5 : 2 rry : 1 part to ber brush. T concrete by ssure on neg k shall be c hance shall | Rs for wa reserv (5 part water) the mate gative carried carry g | terproofing treation, sewage & wat s integral crystall for horizontal surf erial shall meet th than 90% comp side. The crystall out all complete a | ment to the RCC er treatment plant, ine slurry : 2 parts aces and applying he requirements as ared with control ine slurry shall be s per specification |
| 10 22.23 | Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and r capable of self-healing of cracks and the direction of the engine 3.2 leakage. For horizontal surface on Bottom slab inside-grit box | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-chane coat (1 | lline slurr ment, wat repared by parts integ rith the he reducing to 16 ba width of arge. The @1.10 kg 2.5 | y of hydr er tanks, rr y mixing ir ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.5 | oof slab n the ra line sluu netic fil lity of tic pres | (a) in nature os, podiums, ttio of 5 : 2 rry : 1 part v oper brush. T concrete by ssure on neg ssure on neg ck shall be c hance shall 6.25 | Rs for wa reserv (5 part water) 'he mat / more gative arried carry g | terproofing treation, sewage & wat s integral crystall for horizontal surf erial shall meet th than 90% comp side. The crystall out all complete a | ment to the RCC er treatment plant, ine slurry : 2 parts aces and applying he requirements as ared with control ine slurry shall be s per specification |
| 10 22.23 | Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine 3.2 leakage. For horizontal surface on | the base k etc., p 3 : 1 (3 r) side w i.e by resistant up to a er-in-cha ne coat (1 1 | lline slurr ment, wat repared by parts integ rith the he reducing to 16 ba width of arge. The a1.10 kg 2.5 5.2 | y of hydr er tanks, rr y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.5 1.45 | oof slab n the ra line sluu netic fil lity of tic pres | (a) in nature os, podiums, ttio of 5 : 2 rry : 1 part of ber brush. T concrete by ssure on neg ssure on neg ssure shall be c nance shall 6.25 7.54 | Rs for wa reserv (5 part water) 'he mat / more gative arried carry g m ² m ² | terproofing treation, sewage & wat s integral crystall for horizontal surf erial shall meet th than 90% comp side. The crystall out all complete a | ment to the RCC er treatment plant, ine slurry : 2 parts aces and applying he requirements as ared with control ine slurry shall be s per specification |
| 10 22.23 | Say Providing and applying integra structures like retaining walls of i tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and in capable of self-healing of cracks and the direction of the engine 3.2 leakage. For horizontal surface on Bottom slab inside-grit box Bottom slab inside-channels STP | the base k etc., p 3 : 1 (3 p) 3 : 1 (3 p) 3 : 1 (3 p) 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : 1 : | lline slurr ment, wat repared by parts integ with the he reducing to 16 ba width of arge. The @1.10 kg 2.5 5.2 6.75 | y of hydr er tanks, ro y mixing ii ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p per sqm. 2.5 1.45 1.45 | oof slab n the ra line sluu netic fil lity of tic pres | (a) in nature ss, podiums, tio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg k shall be c ance shall 6.25 7.54 9.79 | Rs for wa reserv (5 part water) The mate matried carry g m^2 m^2 | terproofing treation, sewage & wat s integral crystall for horizontal surf erial shall meet th than 90% comp side. The crystall out all complete a | ment to the RCC er treatment plant, ine slurry : 2 parts aces and applying he requirements as ared with control ine slurry shall be s per specification |
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| | Inside of walls- channels CTU | 1 | 4.9 | | 0.90 | 4.41 | m^2 | | |
|-------------|--|---|---|---|---|--|---|--|------------------|
| + | Base slab inside-channels CTU | 1 | 2.0 | 0.45 | 0.90 | 0.9 | | | |
| | Top slab bottom-channels CTU | 1 | 2.0 | 0.45 | | 0.9 | | | |
| _ | Total | 1 | 2.0 | 0.43 | | 142.10 | | | |
| _ | Deduction | | | | | 142.10 | | | |
| _ | Manhole | 3 | 0.6 | 0.45 | | 0.81 | m^2 | | |
| _ | Total | 5 | 0.0 | 0.43 | | 0.81 | m ² | | |
| _ | Total after deduction | | | | | 141.29 | | | |
| + | Say | | 141.29 | m ² | | | Rs | 418.79 | 59168.3 |
| 12 2.25 | Filling available excavated earth in depth, consolidating each depo | | | | | | | | |
| | Quantity as per item 1 | 1 | | | | 31.49 | m3 | | |
| | Deductions | | | | | | | | |
| | PCC | 1 | | | | 8.32 | m3 | | |
| | Bottom slab | 1 | | | | 11.37 | m3 | | |
| | Quantity after deductions | 1 | | | | 11.8 | m3 | | |
| | Say | | 11.8 | | | | Rs | 269.90 | 3184. |
| 19.1 3 1 | 18. Supplying and fixing C.I. cover the cover to be not less than 23 k | g | frame for | manholes | :455x6 | | - | C.I. cover (light c | luty) the weight |
| _ | G . | 3 | | NT- | | | No. | 1/00 51 | 4000 |
| | Say | | | No. | | | Rs | 1629.51 | 4888. |
| 4 | joints complete as per direction of | of Engine | | rge. 110m | n dia 6 | | | bipe | |
| — | | 1 | 0.45 | | | 0.45 | | | |
| _ | Total | | | | | 0.45 | | | |
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| Earth work in execution by mechanical means (Hydraulic excuvator)/manual means over areas (exceeding 30 cm in depth 15 m in width as well as 10 sqm or plan) including getting out and disposal of excuvated earth lead upto 50 m and lift upt 12.6.1 Shape of tank 1 [put I for restangular and 2 for circular) Equalisation tank 1 300 13 100 253.5 m ³ Fordal 0 253.5 m ³ 0 Rs 223.41 Say 253.5 m ³ 0 Rs 223.41 Do for itemOrdinay rock 0.33 253.5 88.725 @Rs 433.01 Do for itemOrdinay rock 0.32 253.5 38.025 @Rs 898.50 3416.55 Earth work in excuration by mechanical means (Hydraulic excurator)/manual means over areas (exceeding 30 cm in depth 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excurated arth lead upto 50 m and lift upt 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excurated arth lead upto 50 m and lift upt 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excurated arth lead upto 50 m and lift upt 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excurated arth lead upto 50 m and lift upt 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excurated arth lead upto 50 m and lift upt 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excurated arth lead upto 50 m and lift upt 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excurated ar | Ite m No | Item Code | Description | No | L | в | Н | V | Unit | Data | Amount |
|---|----------------|--------------|--|--|--|---|---|--|--|--|--|
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| soil0.25253.563.375 $@Rs$ 334.4421194.84Do for itemOrdinay rock0.25253.563.375 $@Rs$ 632.1440062.11Medium rock with blasting0.25253.563.375 $@Rs$ 740.4046922.83Medium rock with out blasting0.25253.563.375 $@Rs$ 1097.6469562.65Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift upto 3 m to 4.5m, as directed by Engineer-in-charge(iind depth)Equalisation tank113.00131.30219.7Do for itemAll kinds of soil0.25219.754.925 $@Rs$ 831.2845657.86Medium rock with blasting0.25219.754.925 $@Rs$ 831.2845657.86Medium rock with out blasting0.25219.754.925 $@Rs$ 939.5351603.84Medium rock with out blasting0.25219.754.925 $@Rs$ 1296.7771225.07Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - Alwork up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded stone aggregate 40 mm moninal size)Equalisation tank113130.1525.35m ³ Footing base pcc161.31.30.1525.35m ³ Say29.41m ³ @Rs7527.06221370.86 <td></td> <td></td> <td>1</td> <td>1</td> <td>13.00</td> <td>13</td> <td>1.50</td> <td>253.5</td> <td></td> <td></td> <td>-</td> | | | 1 | 1 | 13.00 | 13 | 1.50 | 253.5 | | | - |
| 0.25253.563.375 (33.75) $(33.75$ | | | soil | 0.25 | 253.5 | | | 63.375 | @Rs | 334.44 | 21194.84 |
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| 0.25 253.5 63.375 @Rs 1097.64 69562.63 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth 1.5 m in width as uell as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift upto 3 m to 4.5m, as directed by Engineer-in-charge(ind depth) Equalisation tank 1 13.00 13 1.30 219.7 Do for itemAll kinds of soil 0.25 219.7 54.925 @Rs 445.47 24467.20 Do for itemOrdinay rock 0.25 219.7 54.925 @Rs 831.28 45657.80 Medium rock with blasting 0.25 219.7 54.925 @Rs 939.53 51603.84 Medium rock with out blasting 0.25 219.7 54.925 @Rs 1296.77 71225.02 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - Al work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded stone aggregate 40 mm nominal size) Equalisation tank 1 13 13 0.15 2.5.3 m ³ | | | - | 0.25 | 253.5 | | | 63.375 | @Rs | 740.40 | 46922.85 |
| 3 m to 4.5m, as directed by Engineer-in-charge(iind depth) Equalisation tank 1 13.00 13 1.30 219.7 Do for itemAll kinds of soil 0.25 219.7 54.925 @Rs 445.47 24467.20 Do for itemOrdinay rock 0.25 219.7 54.925 @Rs 831.28 45657.80 Medium rock with blasting 0.25 219.7 54.925 @Rs 939.53 51603.84 Medium rock with out blasting 0.25 219.7 54.925 @Rs 1296.77 71225.02 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - Al work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded store aggregate 40 mm nominal size) Equalisation tank 1 13 0.15 25.35 m ³ Footing base pcc 16 1.3 1.3 0.15 25.35 m ³ 1 1 Say 29.41 m ³ @Rs 7527.06 221370.80 Footing base pcc 16 1.3 1.3 0.15 4.06 1 Say 29.41 m ³ @Rs <td< td=""><td></td><td></td><td>Earth work in excavation by mee</td><td>hanical</td><td>means (H</td><td></td><td></td><td>r)/manual m</td><td>eans o</td><td>ver areas (exceed</td><td>ing 30 cm in depth,</td></td<> | | | Earth work in excavation by mee | hanical | means (H | | | r)/manual m | eans o | ver areas (exceed | ing 30 cm in depth, |
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| soil 0.25 219.7 54.925 @Rs 445.47 24467.20 Do for itemOrdinay rock 0.25 219.7 54.925 @Rs 831.28 45657.80 Medium rock with blasting 0.25 219.7 54.925 @Rs 939.53 51603.84 Medium rock with out blasting 0.25 219.7 54.925 @Rs 1296.77 71225.02 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - AI work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zne-III): 6 graded stone aggregate 40 mm nominal size) Autom on the second concentration of the second concentration concrete work, using Sulphate Resistant Cement (SRC) content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying in position accelerate/ retard setting of concrete, improve workability without impairing strength and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying excluding the cost of centering, s | | | Equalisation tank | 1 | 13.00 | 13 | 1.30 | 219.7 | | | |
| 0.25 219.7 54.925 @Rs 831.28 45657.80 Medium rock with blasting 0.25 219.7 54.925 @Rs 939.53 51603.84 Medium rock with out blasting 0.25 219.7 54.925 @Rs 1296.77 71225.02 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - AI work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded stone aggregate 40 mm nominal size) Equalisation tank 1 13 0.15 25.35 m ³ Image: Concent and the cost of centering and shuttering - AI Footing base pcc 16 1.3 1.3 0.15 25.35 m ³ Image: Concent and and another addition and addition addition and addition and addition addition addition addition additaddition addition addition addition addition additadd | | | soil | 0.25 | 219.7 | | | 54.925 | @Rs | 445.47 | 24467.20 |
| Medium rock with blasting 0.25 219.7 54.925 @Rs 939.53 51603.84 Medium rock with out blasting 0.25 219.7 54.925 @Rs 939.53 51603.84 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - Al 1296.77 71225.02 2 4.1.6 work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded stone aggregate 40 mm nominal size) Equalisation tank 1 13 0.15 25.35 m ³ Equalisation tank 1 13 1.3 0.15 25.35 m ³ 100 < | | | Do for itemOrdinay rock | 0.25 | 210.7 | | | 54 025 | @ P c | 921.29 | 15657.86 |
| Medium rock with out blasting 0.25 219.7 54.925 @Rs 1296.77 71225.02 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - Al work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded stone aggregate 40 mm nominal size) For the control of the cost of centering and shuttering - Al monomial size 2 4.1.6 Equalisation tank 1 13 0.15 25.35 m ³ Footing base pcc 16 1.3 1.3 0.15 4.06 1 Total 29.41 m ³ 29.41 m ³ 221370.80 Providing and laying in position ready mixed M-30 grade concrete for reinforced cement concrete work, using Sulphate Resistant Cement (SRC) content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and turability as per direction of the Engineer-in-charge. (Note :- Cement content considered in this item is @ 330.3 5.34.1 kg/ ³ .Excess/less cement used as per design mix is payable/recoverable separately). <td></td> <td></td> <td>Medium rock with blasting</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> | | | Medium rock with blasting | | | | | | - | | |
| 2 4.1.6 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - Al work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (zone-III): 6 graded stone aggregate 40 mm nominal size) Equalisation tank 1 13 0.15 25.35 m³ Footing base pcc 16 1.3 1.3 0.15 4.06 Total 29.41 m³ 29.41 m³ 29.41 m³ 21370.80 Providing and laying in position ready mixed M-30 grade concrete for reinforced cement concrete work, using Sulphate Resistant Cement (SRC) content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended for proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge. (Note :- Cement considered in this item is @ 336 3 5.34.1 kg/ ³ .Excess/less cement used as per design mix is payable/recoverable separately). | | | | | | | | | 0 | | |
| Footing base pcc 16 1.3 1.3 0.15 4.06 Total 29.41 m ³ 29.41 m ³ Say 29.41 m ³ @ Rs 7527.06 221370.80 Providing and laying in position ready mixed M-30 grade concrete for reinforced cement concrete work, using Sulphate Resistant Cement (SRC) content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended 5.37.1 proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and turability as per direction of the Engineer-in-charge. (Note :- Cement content considered in this item is @ 330 3 5.34.1 kg/ ³ .Excess/less cement used as per design mix is payable/recoverable separately). | 2 | 4.1.6 | work up to plinth level : 1:3:6 (1 | cement | concrete | of specifi | | le excluding 5 graded stor | the cone aggr | ost of centering a | und shuttering - All |
| Total 29.41 m³ Say 29.41 m³ @ Rs 7527.06 221370.80 Providing and laying in position ready mixed M-30 grade concrete for reinforced cement concrete work, using Sulphate Resistant Cement (SRC) content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended 5.37.1 proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and turability as per direction of the Engineer-in-charge. (Note :- Cement content considered in this item is @ 330 (3 5.34.1 kg/ ³ .Excess/less cement used as per design mix is payable/recoverable separately). | | | 1 | 1 | 13 | 13 | 0.15 | 25.35 | m ³ | | |
| Say 29.41 m ³ @ Rs 7527.06 221370.86 Providing and laying in position ready mixed M-30 grade concrete for reinforced cement concrete work, using Sulphate Resistant Cement (SRC) content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended 5.37.1 proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer-in-charge. (Note :- Cement considered in this item is @ 330 (3 5.34.1 kg/ ³ .Excess/less cement used as per design mix is payable/recoverable separately). | | | | 16 | 1.3 | 1.3 | 0.15 | | | | |
| Providing and laying in position ready mixed M-30 grade concrete for reinforced cement concrete work, using Sulphate Resistant Cement (SRC) content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work, including pumping of R.M.C. from transit mixer to site of laying excluding the cost of centering, shuttering finishing and reinforcement, including cost of admixtures in recommended 5.37.1 proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and transbility as per direction of the Engineer-in-charge. (Note :- Cement content considered in this item is @ 330 3 5.34.1 kg/ ³ .Excess/less cement used as per design mix is payable/recoverable separately). | | | | | | 3 | | | | | |
| | | + | Providing and laying in position Resistant Cement (SRC) content transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of | ent as p nsit mix cement shutter ccelerat the Eng | nixed M-3 per appro er for all l concrete ing finish te/ retard | 60 grade co ved design eads, havin work, inclu- ing and re- setting of co harge. (N | n mix, ng cont uding p einforce concret ote :- | for reinford manufactur inuous agita umping of H ement, inclu e, improve Cement co | ced cer ed in ited mi R.M.C. iding c workab | nent concrete wo fully automatic l xer, manufactured from transit mixe ost of admixture ility without imp | rk, using Sulphate batching plant and d as per mix design er to site of laying, es in recommended pairing strength and |
| For equalisation tank | 3 | J.J.T. I | | | , i i i i i i i i i i i i i i i i i i i | aya010/100 | .5,0140 | ic separately | ·)· | | |

| | | Inverted beam | 4 | 12.5 | 0.35 | 0.65 | 11.375 | | | |
|---|-----------------------|---|--|---|--|--|---|--|---|---|
| | | | 4 | 11.4 | 0.35 | 0.65 | 10.374 | | | |
| | | Bottom slab cum raft | . 1 | 13.00 | | 0.45 | 76.05 | m ³ | | |
| | | | 1 | 15.00 | 15.00 | 0.15 | 97.799 | | | |
| | | | | 97.799 | m3 | | | | 10404.79 | 1017578.0 |
| a | 5.37.2 + 5.34.1 | Providing and laying in position i work, using Sulphate Resistant C fully automatic batching plant an continuous agitated mixer, manuic concrete work, including pumpin centering, shuttering finishing an proportions as per IS : 9103 to ac impairing strength and durability considered in this item is @ 330 separately). | d transp factured g of R.M d reinfor celerate as per d | SRC) cont orted to si as per miz A.C. from recement, in / retard se lirection or | ent as per te of work x design of transit mix ncluding co tting of co f the Engir | approventin transference and transference approventions approvention a | ed design m sit mixer for ied grade fo te of laying dmixtures in improve wo charge. (No | ix, man all lead r reinfo , exclud n recom rkabilit te :- Ce | ufactured in ds, having rced cement ding the cost of mended y without ment content | |
| u | 0.0 | Long wall | 2 | 11.90 | 0.30 | 4.10 | 29.27 | m ³ | | |
| | | Short wall | 2 | 11.30 | | 4.10 | 29.27 | | | |
| | | Walk way | 4 | 11.85 | | 0.10 | 27.8 | | | |
| | | deduction-Manhole | 1 | 0.60 | 0.45 | 0.10 | 0.04 | | | |
| | | Total after deduction | - | 0.00 | 0.15 | 0.10 | 59.16 | m ³ | | |
| | | Say | | 59.16 | m ³ | | | Rs | 12129.26 | 717567.1 |
| | | Quantity as per item No.3 & 3a | 1 | | 156.96 | m' | 120 | kg/m ³ | 18835.08 | |
| | | Quantity as per item No.3 & 3a Total Say | 1 | 18835.1 | | m | | kg/m² Rs | 18835.08 18835.08 104.91 | kg |
| 5 | 4.12 | Total | 1 water p | | kg | | @ | Rs | 18835.08 104.91 | kg 1975974.1 |
| 5 | 4.12 | Total Say Extra for providing and mixing | 1 water p | | kg | cement | @ t concrete v | Rs | 18835.08 104.91 | kg 1975974.1 t of cement as pe |
| 5 | 4.12 | Total Say Extra for providing and mixing manufacturer's specification. | 1 water p | | kg naterial in | cement | @ t concrete v | Rs vork in | 18835.08 104.91 doses by weight | kg 1975974.1 t of cement as po kg |
| 5 | 4.12 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 | 1 water p | | kg naterial in 156.96 | cement | @ t concrete v 340 | Rs vork in | 18835.08 104.91 doses by weight 53366.06 | kg 1975974.1 t of cement as po kg kg |
| | 4.12 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total | 1 | proofing n 1067.32 | kg naterial in 156.96 bags | cement m ³ | (a) t concrete v 340 (a) emoval of t | Rs vork in kg/m ³ Rs form fo | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 | kg 1975974.1 t of cement as po kg kg 75528.9 |
| | | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ | 1 | proofing n 1067.32 | kg naterial in 156.96 bags pping etc. | cement m ³ | (a) t concrete v 340 (a) emoval of t | Rs vork in kg/m ³ Rs form fo | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 | kg 1975974.1 t of cement as po kg kg 75528.9 |
| | | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete | 1 ing stru | 1067.32 tting, pro | kg naterial in 156.96 bags pping etc. | cement m ³ and re | @ t concrete v 340 @ emoval of t 23.04 65.00 | Rs vork in kg/m ³ Rs form fo m ² | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 | kg 1975974.1 t of cement as po kg kg 75528.9 |
| | | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab | 1 ling stru | 1067.32 tting, pro 25.6 | kg naterial in 156.96 bags pping etc. | cement m ³ and ro 0.45 | @ t concrete v 340 @ emoval of t 23.04 65.00 59.28 | Rs vork in kg/m ³ Rs form fo | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 | kg 1975974.1 t of cement as pe kg kg 75528.9 |
| | | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab | 1 ing stru 2 4 | 1067.32 tting, pro 25.6 12.5 11.4 | kg naterial in 156.96 bags pping etc. | cement m ³ and re 0.45 1.30 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 | Rs vork in kg/m ³ Rs form fo m ² m ² | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 | kg 1975974.1 t of cement as pe kg kg 75528.9 |
| | | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side | 1 ing stru 2 4 | 1067.32 tting, pro 25.6 12.5 | kg naterial in 156.96 bags pping etc. | cement m ³ and re 0.45 1.30 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 | Rs vork in kg/m ³ Rs form fo | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 | kg 1975974.1 t of cement as po kg kg 75528.9 footings, bases o |
| 6 | | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total | 1 ing stru 2 4 4 ing stru | 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, pro | kg naterial in 156.96 bags pping etc. m ² pping etc. | cement m ³ and re 0.45 1.30 1.30 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 (a) emoval of f | Rs vork in kg/m ³ Rs form for m ² Rs form for | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 or :Foundations, 350.00 | kg 1975974.1 t of cement as pe kg kg 75528.9 footings, bases of 51562.5 |
| 6 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside | 1 ing stru 2 4 4 ing stru | 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, pro | kg naterial in 156.96 bags pping etc. m ² pping etc. rrses etc. | cement m ³ and re 0.45 1.30 1.30 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 (a) emoval of f 195.16 | Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² Rs | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 or :Foundations, 350.00 | kg 1975974.1 t of cement as per- kg kg 75528.9 footings, bases of 51562.5 |
| 6 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl | 1 ing stru 2 4 4 ing stru inth and | 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, pro string cou | kg naterial in 156.96 bags pping etc. m ² pping etc. rses etc. | cement m ³ and re 0.45 1.30 1.30 and re | (a) t concrete v 340 (a) emoval of f 23.04 65.00 59.28 147.32 (a) emoval of f 195.16 185.32 | Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 or :Foundations, 350.00 | kg 1975974.1 t of cement as per- kg kg 75528.9 footings, bases of 51562.5 |
| 6 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside Total | 1 ing stru 2 4 4 4 ing stru inth and 2 | 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, pro string cou 23.80 22.60 | kg naterial in 156.96 bags pping etc. m ² pping etc. rrses etc. | cement m ³ and ro 0.45 1.30 1.30 and ro 4.10 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 (a) emoval of f 195.16 185.32 380.48 | Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² m ² m ² m ² | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 or :Foundations, 350.00 | kg 1975974.1 t of cement as per- kg kg 75528.9 footings, bases of 51562.5 |
| 6 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside | 1 ing stru 2 4 4 4 ing stru inth and 2 | 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, pro string cou 23.80 | kg naterial in 156.96 bags pping etc. m ² pping etc. rrses etc. | cement m ³ and ro 0.45 1.30 1.30 and ro 4.10 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 (a) emoval of f 195.16 185.32 380.48 | Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² | 18835.08 104.91 doses by weight 53366.06 53366.06 70.77 or :Foundations, 350.00 | kg 1975974.1 t of cement as p kg kg 75528.9 footings, bases of 51562.5 ickness) includir |
| 7 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside Total | 1 ing stru 2 4 4 4 4 2 2 | 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, pro string cou 23.80 22.60 380.48 | kg naterial in 156.96 bags pping etc. m ² pping etc. rses etc. m ² | cement m ³ and ra 0.45 1.30 1.30 and ra 4.10 4.10 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 (a) emoval of t 195.16 185.32 380.48 (a) | Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² Rs | 18835.08 104.91 doses by weigh 53366.06 53366.06 70.77 or :Foundations, 350.00 r :Walls (any th 748.62 | kg 1975974.1 t of cement as per- kg kg 75528.9 footings, bases of 51562.5 ickness) includin 284836.0 |
| 7 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls inside Total Say Centering and shuttering includ balconies and access platform Walk way | 1 ing stru 2 4 4 4 4 2 2 | 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, pro string cou 23.80 22.60 380.48 | kg naterial in 156.96 bags pping etc. m ² pping etc. m ² ping etc. | cement m ³ and ra 0.45 1.30 1.30 and ra 4.10 4.10 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 (a) emoval of t 195.16 185.32 380.48 (a) | Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² Rs form for | 18835.08 104.91 doses by weigh 53366.06 53366.06 70.77 or :Foundations, 350.00 r :Walls (any th 748.62 | kg 1975974.1 t of cement as per- kg kg 75528.9 footings, bases of 51562.5 ickness) includin 284836.0 |
| 7 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside Total Say Centering and shuttering includi attached pilasters, butteresses, pl For walls outside For walls outside Total Say Centering and shuttering includi balconies and access platform | 1 ing stru 2 4 4 4 ing stru inth and 2 2 ing strut | 1067.32 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, proj string cou 23.80 22.60 380.48 tting, prop | kg naterial in 156.96 bags pping etc. m ² pping etc. m ² ping etc. m ² | cement m ³ and ra 0.45 1.30 1.30 and ra 4.10 4.10 | (a) (c) | Rs vork in kg/m ³ Rs form fo m ² m ² Rs corm fo m ² m ² m ² Rs rm for | 18835.08 104.91 doses by weigh 53366.06 53366.06 70.77 or :Foundations, 350.00 r :Walls (any th 748.62 | kg 1975974.1 t of cement as per- kg kg 75528.9 footings, bases of 51562.5 ickness) includin 284836.0 |
| 7 | 5.9.1 | Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Beam side Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls inside Total Say Centering and shuttering includ balconies and access platform Walk way | 1 ing stru 2 4 4 4 ing stru inth and 2 2 2 ing strut ing strut | 1067.32 1067.32 tting, pro 25.6 12.5 11.4 147.32 tting, proj string cou 23.80 22.60 380.48 ting, prop 12.30 | kg naterial in 156.96 bags pping etc. m ² pping etc. rses etc. m ² ping etc. m ² ping etc. 11.6 | cement m ³ and ra 0.45 1.30 1.30 and ra 4.10 4.10 | (a) t concrete v 340 (a) emoval of t 23.04 65.00 59.28 147.32 (a) emoval of f 195.16 185.32 380.48 (a) noval of fo 24.60 134.56 159.16 | Rs vork in kg/m ³ Rs form fo m ² m ² Rs corm fo m ² m ² m ² Rs rm for | 18835.08 104.91 doses by weigh 53366.06 53366.06 70.77 or :Foundations, 350.00 r :Walls (any th 748.62 | kg 1975974.1 t of cement as per- kg kg 75528.9 footings, bases of 51562.5 ickness) includin 284836.0 |

| | Providing and applying integr | | | | | | | | |
|------------------------|--|-----------------------|---------------------------|--------------------------------|---------|--|---------------------------------------|------------------------------|--------------------|
| | structures like retaining walls o tunnels / subway and bridge de | | | | | | | | |
| | water) for vertical surfaces and | - | | | | | | | |
| | the same from negative (international states) | | | | | | | | |
| | specified in ACI 212-3R-2010 | | | | | | | | |
| | concrete as per DIN 1048 and | | | | | | | | |
| | capable of self-healing of crack | | | | | | | | |
| 9 22.23 | and the direction of the engine. I leakage. For vertical surface two | | | | perform | hance shall | carry g | guarantee for 10 y | years against any |
| 9 22.23 | Inside of walls | 0 coats @ | 22.6 | ber sqiii | 4.10 | 185.32 | m ² | | |
| | Total | 2 | 22.0 | | 4.10 | 185.32 | | | |
| | Say | | 185.32 | m^2 | | 1 | Rs | 595.28 | 110316.40 |
| | GST component | | 105.52 | | | u. | Rs | 575.20 | 0.00 |
| | | | | | | | | | |
| | Providing and applying integr | - | | | - | | | | |
| | structures like retaining walls o | | | | | | | | |
| | tunnels / subway and bridge de water) for vertical surfaces and | - | | | | | | | |
| | the same from negative (international states) | | | - | | | | | |
| | specified in ACI 212-3R-2010 | | | | | | | | |
| | concrete as per DIN 1048 and | | | | | | | | |
| | capable of self-healing of crack | | | | | | | | |
| | and the direction of the engin | | - | | perform | nance shall | carry g | guarantee for 10 y | years against any |
| 10 22.23 | 2 leakage. For horizontal surface | one coat (| | | | 127 (0 | m ² | <u>г</u> | |
| _ | Bottom slab inside | 1 | 11.3 | 11.3 | | 127.69 | | | |
| _ | Total | | 105 (0 | ² | | 127.69 | | 450.55 | |
| | Say | | 127.69 | m | | <u>(a)</u> | Rs | 458.77 | 58580.28 |
| 11 13.7. | 1 12 mm cement plaster finished | with a flo | ating coat | of neat ce | ment :1 | :3 (1 cemen | t : 3 fir | ne sand) | |
| | Outside walls | 2 | 22.8 | | 4.1 | 186.96 | | | |
| | Inside of walls | 2 | 22.6 | | 4.10 | 185.32 | m ² | | |
| | Base slab inside | 1 | 11.3 | 11.3 | | 127.69 | | | |
| | Walkway | 4 | 11.85 | 1 | | 47.4 | | | |
| | Total | | | | | 547.37 | m ² | | |
| | Say | | 547.37 | m ² | | | Rs | 418.79 | 229231.59 |
| | ~, | | | | | | | | |
| | Filling available excavated earth | | | | | | | | |
| 12 2.25 | in depth, consolidating each dep | posited la | yer by ram | ming and | waterir | ng, lead up to | o 50 m | and lift upto 1.5 m | |
| | Quantity as per item 1 | 1 | | | | 726.7 | m3 | | |
| | Deductions | | | | | | | | |
| | PCC | 1 | | | | 25.35 | m3 | | |
| | Bottom slab | 1 | | | | 76.05 | m3 | | |
| | Tank | 1 | | | | 580.60 | | | |
| | Quantity after deductions | 1 | l | l | | 44.7 | | | |
| | Say | | 44.7 | m ³ | | | Rs | 269.90 | 12064.16 |
| | · · · · | 1 | | | ·155v6 | 0 | | | |
| 10.18 | Sumplying and figuing C L across | without | | | | | | | |
| 19.18 13 1 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | frame for | manholes | .45580 | i o mini i ceu | Buim | | uty) the weight of |
| | 5. Supplying and fixing C.I. cover the cover to be not less than 23 | | frame for | manholes | .455x0 | 1 | - | | uty) the weight of |
| | the cover to be not less than 23 | | | | .435x0 | 1 | No. | | |
| | | | | manholes No. | .43380 | 1 | - | 1629.51 | 1629.51 |
| | the cover to be not less than 23 Say | kg 1 | 1 | No. | | 1 | No. Rs | 1629.51 | 1629.51 |
| 13 1 | the cover to be not less than 23 Say Providing and fixing uPVC pip | kg 1 Des & fitt | 1 ings inclu | No. dings join | ting of | 1 @ | No. Rs one ste | 1629.51 p uPVC solvent co | 1629.51 |
| 13 1 | the cover to be not less than 23 Say | kg 1 Des & fitt | 1 ings inclueer in Cha | No. dings join rge. 110m | ting of | 1 @ pipes with Kgf/cm ² - fo | No. Rs one ste r vent j | 1629.51 p uPVC solvent co | 1629.51 |
| 19.18 13 1 14 | the cover to be not less than 23 Say Providing and fixing uPVC pip | kg 1 Des & fitt | 1 ings inclu | No. dings join rge. 110m | ting of | 1 @ | No. Rs one ste r vent j m | 1629.51 p uPVC solvent co | 1629.51 |

| | Say | | 0.45 | m | | (a) | Rs | 1471.91 | 662.36 |
|--------------------------------|---|--|--|---|--|--|--|---|--|
| | Providing orange colour safety fo | ot rest c | of minimu | m 6 mm th | ick plas | stic encapsu | lated a | s per IS: 10910 | |
| | on 12 mm dia steeel bar conformi | ing to IS | 5:1786, ha | ving minin | num cro | oss section a | s 23 m | m x 25 mm and | |
| | over all minimum length 263 mm | and wid | dth as 165 | mm with | minimu | m 112 mm | space b | between | |
| | protruded legs having 2 mm tread | | | | | | | | |
| 15 19.16 | adequate anchoring projections or | n tail ler | ngth on 13 | 8 mm as p | er stand | dard drawin | g and s | uitable to with | |
| | stand the bend test and chemical n | | | | | | | | |
| | permanent identification mark to | | | - | | | | | |
| | 30x20x15 cm cement concrete blo | | 6 (1ceme | nt: 3 coars | e sand: | 6 graded st | one agg | gregate 20 mm | |
| | nominal size) Complete as per des | sign | | | | | | | |
| | | 12 | | | | 12 | No. | | |
| | Say | | 12 | No. | | (a) | Rs | 568.88 | 6826.56 |
| | Filling water with 5000 litre tanke | ers fited | in lorry a | nd convey | ing wat | er from a di | stance | of 5 km | |
| | (average) to the reservoir site and | | | | | | | | |
| | 5 HP diesel engine pump set , hire | | - | | | - | | - | |
| 1 (100 2 | complete. | | - | | - | - | | | |
| 16 100.3 | | | | | | | | | |
| | For STP | 1 | 11.3 | 11.3 | 4.1 | 523.529 | m3 | | |
| | total | | | | | 523.529 | | | |
| | Say | | 523.53 | Kilo litre | | (a) | Rs | 218.95 | 114625.06 |
| | Providing and fixing hand rail of | approve | ed size by | welding et | c. to ste | eel ladder ra | iling, b | alcony railing, | |
| 17 10.26 | 5.3 staircase railing and similar work | s, incluc | ing apply | ing primin | g coat o | of approves | steel p | rimer. | |
| | - | | | - | | - | | | |
| | 50mm dia G.I5.17kg/m , 32mm | dia GI. | 3 17kg/m | | | | | | |
| | Outer total-51.4m/1m c/c | | -5.17Kg/III | | | | | 1 | |
| | vertical 50mm dia | 52 | | | 0.75 | 5.17 | 1. | 201 (2 | |
| | ventical solilin dia | 52 | | | 0.75 | 5.17 | кg | 201.63 | |
| | | | | | | | | | |
| | | _ | | | | | | | |
| | Horizontal 0.25m c/c-32mm dia | 3 | 51.4 | | | 3.17 | | 488.81 | |
| | Say | | 690.444 | - | | @ | Rs | 194.18 | 134069.84 |
| | Say Finishing with Deluxe Multi surfa | | 690.444 | - | and ex | @ | Rs | 194.18 | 134069.84 |
| | Say Finishing with Deluxe Multi surfa manufacturers specifications: | | 690.444 | - | and ex | @ | Rs | 194.18 | 134069.84 |
| 18 13.48. | Say Finishing with Deluxe Multi surfa manufacturers specifications: | | 690.444 | - | and ex | @ | Rs | 194.18 | 134069.84 |
| 18 13.48. | Say Finishing with Deluxe Multi surfa manufacturers specifications: | | 690.444 | or interiors | and ex 0.05 | @ | Rs g prime | 194.18 | 134069.84 |
| 18 13.48. | Say Finishing with Deluxe Multi surfa manufacturers specifications: 3 | ace pain | 690.444 t system f | or interiors | | @ ateriors usin | Rs g prime m2 | 194.18 | 134069.84 |
| 18 13.48. | Say Finishing with Deluxe Multi surfa manufacturers specifications: 3 vertical pipe Horizontal pipe | ace pain 52 | 690.444 t system f 0.75 | or interiors | 0.05 | @ tteriors usin 1.95 4.93 | Rs g prime m2 | 194.18 | 134069.84 |
| 18 13.48. | Say Finishing with Deluxe Multi surfa manufacturers specifications: .3 vertical pipe Horizontal pipe Say | ace pain 52 3 | 690.444 t system f 0.75 51.4 6.88 | m2 | 0.05 | @ teriors usin 1.95 4.93 @ | Rs g prime m2 m2 Rs | 194.18 er as per 154.62 | |
| 18 13.48. | Say Finishing with Deluxe Multi surfamanufacturers specifications: .3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or series) | ace pain 52 3 or more | 690.444 t system f 0.75 51.4 6.88 coats) at a | m2 Il location | 0.05 0.03 s prepa | (@ (teriors usin) 1.95 4.93 (@) red and app | Rs g prime m2 m2 Rs lied as | 194.18 er as per 154.62 per | |
| 18 13.48. | Say Finishing with Deluxe Multi surfa manufacturers specifications: .3 vertical pipe Horizontal pipe Say | ace pain 52 3 or more | 690.444 t system f 0.75 51.4 6.88 coats) at a | m2 Il location | 0.05 0.03 s prepa | (@ (teriors usin) 1.95 4.93 (@) red and app | Rs g prime m2 m2 Rs lied as | 194.18 er as per 154.62 per | |
| | Say Finishing with Deluxe Multi surfarmanufacturers specifications: .3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl) On concrete work | ace pain 52 3 or more | 690.444 t system f 0.75 51.4 6.88 coats) at a | m2 Il location | 0.05 0.03 s prepa | (@ (teriors usin) 1.95 4.93 (@) red and app | Rs g prime m2 m2 Rs lied as | 194.18 er as per 154.62 per | |
| 18 13.48. 19 13.52. | Say Finishing with Deluxe Multi surfarmanufacturers specifications: .3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl) On concrete work | ace pain 52 3 or more | 690.444 t system f 0.75 51.4 6.88 coats) at a | m2 Il location | 0.05 0.03 s prepa | (@ (teriors usin) 1.95 4.93 (@) red and app | Rs g prime m2 m2 Rs lied as | 194.18 er as per 154.62 per | |
| | Say Finishing with Deluxe Multi surfarmanufacturers specifications: .3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl) On concrete work | ace pain 52 3 or more | 690.444 t system f 0.75 51.4 6.88 coats) at a | m2 Il location | 0.05 0.03 s prepa | (@ (teriors usin) 1.95 4.93 (@) red and app | Rs g prime m2 m2 Rs lied as | 194.18 er as per 154.62 per | |
| | Say Finishing with Deluxe Multi surfarmanufacturers specifications: .3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl) On concrete work | ace pain 52 3 or more | 690.444 t system f 0.75 51.4 6.88 coats) at a | m2 m2 priming c | 0.05 0.03 s prepa | (@ (teriors usin) 1.95 4.93 (@) red and app | Rs g prime m2 m2 Rs lied as surface | 194.18 er as per 154.62 per | |
| | Say Finishing with Deluxe Multi surfarmanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 | 52 3 or more uding a | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 | m2 m2 priming c | 0.05 0.03 s prepa | (a) (teriors usin (1.95 (4.93) (a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c | Rs g prime m2 Rs lied as surface | 194.18 er as per 154.62 per e, etc. complete. 547.37 | 1064.48 |
| | Say Finishing with Deluxe Multi surfarmanufacturers specifications: .3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work .2 Quantity as per item code 13.7.1 Say | 52 3 or more uding a | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate | m2 m2 priming c | 0.05 0.03 s prepa | (a) (teriors usin (1.95 (4.93) (a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c | Rs g prime m2 m2 Rs lied as surface | 194.18 er as per 154.62 per e, etc. complete. | 1064.48 |
| | Say Finishing with Deluxe Multi surfarmanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 | 52 3 or more uding a | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 | m2 m2 priming c | 0.05 0.03 s prepa | (a) (teriors usin (1.95 (4.93) (a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c | Rs g prime m2 Rs lied as surface | 194.18 er as per 154.62 per e, etc. complete. 547.37 | 1064.48 |
| 19 13.52. | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank | 52 3 or more uding a | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 | m2 m2 priming c | 0.05 0.03 s prepa | (a) (teriors usin (1.95 (4.93) (a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c | Rs g prime m2 Rs lied as surface | 194.18 er as per 154.62 per e, etc. complete. 547.37 | 1064.48 |
| 19 13.52. DILUTIC | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank ON TANK FOR CO TREATMEN | 52 3 or more luding a | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 | m2 ll location priming c m2 | 0.05 0.03 s prepa | (a) (teriors usin (1.95 (4.93) (a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c | Rs g prime m2 Rs lied as surface Rs | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 | 1064.48 |
| 19 13.52. DILUTIC | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank ON TANK FOR CO TREATMEN | 52 3 or more uding a | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 | m2 m2 priming c | 0.05 0.03 s prepa | (a) (teriors usin (1.95 (4.93) (a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c | Rs g prime m2 Rs lied as surface Rs | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 | 1064.48 |
| 19 13.52. DILUTIC | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN E Description Earth work in excavation by mecl | 52 3 or more luding a 1 T -rect No hanical 1 | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 | m2 m2 all location priming c m2 m2 m2 | 0.05 0.03 s prepa oat, pre | (@) (teriors usin (1.95 (4.93) (@) (P) (P) (P) (manual m | Rs g prime m2 m2 Rs lied as surface Rs Unit eans o | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 Rate ver areas (exceeding | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth. |
| 19 13.52. DILUTIC | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two omanufacturer's specifications inclon concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN Description Earth work in excavation by mech 1.5 m in width as well as 10 sqm | 52 3 or more luding a 1 T -rect No hanical n on plan | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 | m2 m2 all location priming c m2 m2 m2 | 0.05 0.03 s prepa oat, pre | (@) (teriors usin (1.95 (4.93) (@) (P) (P) (P) (manual m | Rs g prime m2 m2 Rs lied as surface Rs Unit eans o | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 Rate ver areas (exceeding | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth, |
| 19 13.52. DILUTIC m Code | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMENT Pescription Earth work in excavation by mecl 1.5 m in width as well as 10 sqm 1.5 m as directed by Engineer-in | 52 3 or more luding a 1 T -rect No hanical n on plan | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 | m2 m2 all location priming c m2 m2 m2 | 0.05 0.03 s prepa oat, pre | (@) (teriors usin (1.95 (4.93) (@) (P) (P) (P) (manual m | Rs g prime m2 m2 Rs lied as surface Rs Unit eans o | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 Rate ver areas (exceeding | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth, |
| 19 13.52. DILUTIC | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN e Description Earth work in excavation by meel 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- | 52 3 or more luding a 1 (T -rect No hanical 1 on plan) -charge | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 angular L means (Hy) including | m2 m2 m2 ll location priming c m2 m2 m2 griming c | 0.05 0.03 s prepa oat, pre | (@) (teriors usin (1.95 (4.93) (@) (?) (?) (?) (?) (?) (?) (?) (?) (?) (? | Rs g prime m2 m2 Rs lied as surface Rs Unit eans or xcavat | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 Rate ver areas (exceeding | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth, |
| 19 13.52. DILUTIC m Code | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN e Description Earth work in excavation by meel 1.5 m, as directed by Engineer-in-in-in-in-in-in-in-in-in-in-in-in-in- | T -rect No hanical on plan) -charge | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 L means (Hy) including (put 1 for | m2 Ill location priming c m2 m2 B ydraulic ex g getting o rectangula | 0.05 0.03 s prepa oat, pre | @ 1.95 4.93 @ red and app eparation of 0 | Rs g prime m2 m2 Rs lied as surface Rs Unit eans or xcavat | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 Rate ver areas (exceeding | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth. |
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| 19 13.52. DILUTIC m Code | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN e Description Earth work in excavation by meel 1.5 m, as directed by Engineer-in-in-in-in-in-in-in-in-in-in-in-in-in- | T -rect No hanical on plan) -charge | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 L means (Hy) including (put 1 for | m2 Ill location priming c m2 m2 B ydraulic ex g getting o rectangula | 0.05 0.03 s prepa oat, pre | @ 1.95 4.93 @ red and app eparation of 0 | Rs g prime m2 m2 Rs lied as surface Rs Unit eans or xcavat | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 Rate ver areas (exceeding | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth. |
| 19 13.52. DILUTIC m Code | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN e Description Earth work in excavation by meel 1.5 m, as directed by Engineer-in-in-in-in-in-in-in-in-in-in-in-in-in- | 52 3 or more luding a 1 IT -rect No hanical on plan -charge 1 1 | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 L means (Hy) including (put 1 for | m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 rectangula | 0.05 0.03 s prepa oat, pre dut and c ar and 2 | (@) (teriors usin 1.95 4.93 (@) (red and app eparation of 0 (@) (W) (W) (manual m disposal of e 2 for circula (45) | Rs g prime m2 m2 Rs lied as surface Rs Rs Unit eans or xcavat | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 Rate ver areas (exceeding | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth, 50 m and lift upto |
| 19 13.52. DILUTIC m Code | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN e Description Earth work in excavation by meel 1.5 m, as directed by Engineer-in- Shape of tank Dilution tank Do for itemAll kinds of | 52 3 or more luding a 1 T -rect No hanical 1 on plan -charge | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 L means (Hy) including (put 1 for 6.00 | m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 m | 0.05 0.03 s prepa oat, pre dut and c ar and 2 | @ 1.95 4.93 @ red and app paration of 0 0 0 0 0 2 for circula 45 15.75 | Rs g prime m2 m2 Rs lied as surface Rs Unit eans or xcavat | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 wer areas (exceedir ed earth lead upto 223.41 | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth, 50 m and lift upto 3518.63 |
| 19 13.52. DILUTIC m Code | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN Pescription Earth work in excavation by meel 1.5 m, as directed by Engineer-in-1.5 m, as directed by Engin | 1 T -rect No hanical n on plan) -charge 1 0.35 0.35 | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 10 547.37 547.37 (put 1 for 6.00 45 45 | m2 m2 ill location priming c m2 m2 m2 m2 m2 m2 m2 m2 m2 m2 | 0.05 0.03 s prepa oat, pre dut and c ar and 2 | @ (1.95) 4.93) @ red and app paration of 0 @ v v/manual m disposal of e 2 for circula 45 15.75 15.75 | Rs g prime m2 m2 Rs lied as surface Rs Unit eans or xcavat r) m ³ @Rs @Rs | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 ver areas (exceedir ed earth lead upto 223.41 433.01 | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth, 50 m and lift upto 3518.63 6819.92 |
| 19 13.52. DILUTIC m Code | Say Finishing with Deluxe Multi surfamanufacturers specifications: 3 vertical pipe Horizontal pipe Say Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work 2 Quantity as per item code 13.7.1 Say Total Equalisation Tank DN TANK FOR CO TREATMEN e Description Earth work in excavation by meel 1.5 m, as directed by Engineer-in- Shape of tank Dilution tank Do for itemAll kinds of | 52 3 or more luding a 1 T -rect No hanical 1 on plan -charge | 690.444 t system f 0.75 51.4 6.88 coats) at a ppropriate 547.37 547.37 547.37 L means (Hy) including (put 1 for 6.00 | m2 m2 ill location priming c m2 m2 m2 m2 m2 spriming c m2 m2 m2 m2 spriming c | 0.05 0.03 s prepa oat, pre dut and c ar and 2 | (@) (teriors usin 1.95 4.93 (@) red and app eparation of (0) (@) (0) (@) (0) (0) (0) (0) (0) (0) (0) (0) (0) (0 | Rs g prime m2 m2 Rs lied as surface Rs Unit eans or xcavat | 194.18 er as per 154.62 per e, etc. complete. 547.37 232.68 wer areas (exceedir ed earth lead upto 223.41 | 1064.48 127359.49 5816692.08 Amount ng 30 cm in depth, 50 m and lift upto |

| - | 334.44 632.14 740.40 1097.64 | m ³ @Rs | 36 | 1.20 | 5 | 6.00 | 1 | 1.5 m to 3, as directed by Engine | |
|--|--|---|--|--|--|--|---|---|---------|
| 5689. 6663. 9878. nd shuttering - 4 | 632.14 740.40 | @Rs | | | | | 1 | | |
| 5689. 6663. 9878. nd shuttering - 4 | 632.14 740.40 | @Rs | | | | | | | |
| 6663. 9878. nd shuttering - 4 | 632.14 740.40 | \sim | 9 | | | 36 | 0.25 | Do for itemAll kinds of | |
| 6663. 9878. nd shuttering - 4 | 740.40 | @Rs | 9 | | | 36 | 0.25 | Do for itemOrdinay rock | |
| 9878. nd shuttering - A | | @Rs | 9 | | | 36 | 0.25 | Medium rock with blasting | |
| nd shuttering | | @Rs | 9 | | | 36 | 0.25 | Medium rock with out blasting | |
| - | | m^3 | 36 | | | | | Total | |
| - | st of centering at | | | ed orad | of specifie | concrete | cement | Providing and laying in position | |
| , | - | | - | - | - | | | work up to plinth level : 1:3:6 (1 | 2 4.1.6 |
| | 5 | | 4.5 | 0.15 | 5 | 6.00 | 1 | Dilution tank | |
| | | | 4.5 | | | | | Total | |
| 33871. | 7527.06 | Rs | | | m ³ | 4.5 | | Say | |
| s in recommend airing strength a | ost of admixtures ility without impa | ding co workabi ntent c | ement, inclu e, improve v Cement co | oncrete oncrete | ing and re ting of c harge. (No | ing finish e/ retard s ineer-in-c | shutter ccelerat he Eng | of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p | + |
| | | | | | | | | For Dilution tank | |
| | | m ³ | 2.50 | 0.65 | 0.35 | 5.5 | 2 | Inverted beam | |
| | | m ³ | 2.05 | 0.65 | 0.35 | 4.5 | 2 | | |
| | | m ³ | 11.82 | 0.45 | 4.65 | 5.65 | 1 | Bottom slab cum raft | |
| | | m ³ | 8.25 | 3.00 | 0.25 | 5.50 | 2 | Long wall | |
| | | m ³ | 6.75 | 3.00 | | 4.50 | 2 | Short wall | |
| | | | 31.37 | | | | | Total | |
| 326398. | 10404.79 | | | | m3 | 31.37 | | Say | |
| | ls, having rced cement ding the cost of mended y without ment content | all lead r reinfo , exclud n recom rkabilit te :- Ce | sit mixer for ied grade fo te of laying dmixtures in improve wo charge. (No | in trans specific er to si ost of a ncrete, i eer-in- | te of work design of transit mix neluding co tting of con f the Engin | as per mix A.C. from cement, in retard set irection of | l transpo actured g of R.M l reinfor celerate as per d | work, using Sulphate Resistant C fully automatic batching plant and continuous agitated mixer, manuf concrete work, including pumpin centering, shuttering finishing and proportions as per IS : 9103 to ac impairing strength and durability considered in this item is @ 330 i separately). | + |
| | | | 4.18 | 0.15 | 4.80 | 5.80 | 1 | Top Slab | |
| | | | 0.95 | 0.10 | 0.45 | 10.60 | 2 | Walk way | |
| | | | 0.04 | 0.15 | 0.45 | 0.60 | 1 | deduction-Manhole | |
| | | m ³ | 5.09 | | | | | Total after deduction | |
| 61737. | 12129.26 | Rs | | | m ³ | 5.09 | | Say | |
| kg | | - | bars of gra 120 | Treated | hanically 7 36.46 | | | Epoxy coated steel reinforceme binding all complete upto plinth l Quantity as per item No.3 & 3a Total Say | |

| 0 | uantity as par itam No 2 & 2- | 1 | | 26 16 | m | 210 | ka/m ³ | 12204 40 | | |
|--|---|--|---|--|---|--|---|--|--|--|
| | uantity as per item No.3 & 3a | 1 | | 36.46 | m | 340 | kg/m ³ | 12396.40 | | |
| Say | | | 247.928 | haga | | | Rs | 12396.40 7 0. 77 | - | 7544.62 |
| | blumns, etc. for mass concrete | | 247.920 | Dags | | W | ĸs | /0.// | 1 | 1/544.02 |
| | ottom slab | 2 | 10.30 | | 0.45 | 9.27 | m^2 | | | |
| | eam side | 4 | 5.5 | | 1.30 | 28.60 | | | | |
| Dea | | 4 | 4.5 | | 1.30 | 23.40 | | | | |
| Tot | otal | т | ч.5 | | 1.50 | 61.27 | | | | |
| Say | | | 61.27 | m^2 | | | Rs | 350.00 | 1 | 21444.73 |
| | tached pilasters, butteresses, plin | nth and | | | | u | K5 | 550.00 | | .1444.75 |
| | or walls outside | 2 | 10.00 | i ses ete. | 3.00 | 60.00 | m ² | | | |
| | or walls inside | 2 | 9.00 | | 3.00 | 54.00 | | | | |
| | otal | 2 | 9.00 | | 5.00 | 114.00 | | | | |
| Say | | | 114.00 | m^2 | | | Rs | 748.62 | 8 | 35343.01 |
| | | | | | | | | | | |
| | entering and shuttering includin | ng strut | ting, prop | ping etc. | and rer | noval of for | rm for | :Suspended floor | rs, roofs, | landings, |
| | alconies and access platform | 2 | 10.60 | 0.5 | | 10.60 | | [| r | |
| | op slab | 1 | 21.20 | | 0.15 | 3.18 | | | | |
| 1 | 1 | | 5.50 | | 0.13 | | | | | |
| Tot | ottom portion | 1 | 5.50 | 4.3 | | 24.75 38.53 | | | | |
| Say | | | 38.53 | m^2 | | | Rs | 851.52 | 1 | 32808.88 |
| | | amiata | | | 1 .1. |) | | | | |
| stru tun wat the spe | roviding and applying integral ructures like retaining walls of t nnels / subway and bridge deck ater) for vertical surfaces and 3 e same from negative (internal) pecified in ACI 212-3R-2010 norcete as per DIN 1048 and r | he base c etc., p : 1 (3 p) side w i.e by | ment, wat repared by parts integ ith the he reducing | er tanks, ro y mixing in ral crystall lp of synth permeabil | oof slab n the ra line slu netic fil lity of | os, podiums, tio of 5 : 2 rry : 1 part oer brush. T concrete by | reserv (5 part water) The mat more | ior, sewage & wa s integral crystal for horizontal sur erial shall meet t than 90% comp | ter treatme line slurry faces and the require pared with | ent plant, : 2 parts applying ments as n control |
| stru tun wat the spe con cap and | ructures like retaining walls of t nnels / subway and bridge deck ater) for vertical surfaces and 3 e same from negative (internal) becified in ACI 212-3R-2010 oncrete as per DIN 1048 and r pable of self-healing of cracks id the direction of the engineer | he base c etc., p : 1 (3 p) side w i.e by resistant up to a er-in-ch | ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slab n the ra line slut netic fil lity of tic pres | os, podiums, tio of 5 : 2 rry : 1 part per brush. T concrete by ssure on ne k shall be c | reserv (5 part water) The mat more gative | ior, sewage & was s integral crystal for horizontal sur erial shall meet t than 90% comp side. The crystal out all complete a | ter treatme line slurry faces and the require pared with line slurry as per spec | ent plant, : 2 parts applying ments as n control shall be cification |
| stru tun wat spe con cap and 9 22.23.1 leal | ructures like retaining walls of t nnels / subway and bridge deck ater) for vertical surfaces and 3 e same from negative (internal) becified in ACI 212-3R-2010 oncrete as per DIN 1048 and r pable of self-healing of cracks | he base c etc., p : 1 (3 p) side w i.e by resistant up to a er-in-ch | ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slab n the ra line slut netic fil lity of tic pres | os, podiums, tio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne ck shall be c aance shall | reserv (5 part water) The mat more gative | ior, sewage & was s integral crystal for horizontal sur erial shall meet t than 90% comp side. The crystal out all complete a | ter treatme line slurry faces and the require pared with line slurry as per spec | ent plant, : 2 parts applying ments as n control shall be cification |
| 9 22.23.1 leal | ructures like retaining walls of t nnels / subway and bridge deck ater) for vertical surfaces and 3 e same from negative (internal) pecified in ACI 212-3R-2010 norrete as per DIN 1048 and r spable of self-healing of cracks ad the direction of the enginee akage. For vertical surface two of | he base c etc., p : 1 (3 p) side w i.e by resistant up to a er-in-cha | ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The 0.70 kg p | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slab in the ra line slu netic fil lity of tic press The wor perform | os, podiums, tio of 5 : 2 rry : 1 part v per brush. T concrete by ssure on nej ssure on nej sh shall be c hance shall | reserve (5 part water) : The mat more gative : carried carry g | ior, sewage & was s integral crystal for horizontal sur erial shall meet t than 90% comp side. The crystal out all complete a | ter treatme line slurry faces and the require pared with line slurry as per spec | ent plant, : 2 parts applying ments as n control shall be cification |
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| | 100.36 | total Say Providing and fixing hand rail of | pumpir e for tan 1 approve | in lorry a ng the wat ker lorry, 5 60.00 ed size by | er into the tools and o 4 Kilo litre welding et | reservo other ap 3 c. to ste | ir of height opliences an 60 60 @ eel ladder ra | mot less d cost of m3 Rs iling, b | s than 3 m using of water etc. 218.95 alcony railing, | 5119.92 |
|----|--------|--|-------------------------------------|--|---|---------------------------------------|--|---|---|-----------------|
| | | Filling water with 5000 litre tanka (average) to the reservoir site and 5 HP diesel engine pump set , hire complete. total Say Providing and fixing hand rail of | pumpir e for tan 1 approve | in lorry a ng the wat ker lorry, 5 60.00 ed size by | nd convey: er into the tools and o 4 Kilo litre welding et | reservo other ap 3 c. to ste | er from a di ir of height ppliences an 60 60 @ eel ladder ra | mot less d cost of m3 Rs iling, b | of 5 km s than 3 m using of water etc. 218.95 alcony railing, | |
| 16 | 100.36 | Filling water with 5000 litre tanka (average) to the reservoir site and 5 HP diesel engine pump set , hire complete. total Say | pumpir e for tan 1 | in lorry a ng the wat ker lorry, 5 60.00 | nd convey er into the tools and o 4 Kilo litre | reservo other ap | er from a di ir of height ppliences an 60 60 @ | stance not less d cost of m3 Rs | of 5 km s than 3 m using of water etc. 218.95 | |
| 16 | 100.36 | Filling water with 5000 litre tanka (average) to the reservoir site and 5 HP diesel engine pump set , hire complete. total | pumpir | in lorry a ng the wat ker lorry, 5 | nd conveys er into the tools and o 4 | reservo other ap | er from a di ir of height opliences an 60 60 | stance of not less d cost of m3 | of 5 km s than 3 m using of water etc. | |
| 16 | 100.36 | Filling water with 5000 litre tanka (average) to the reservoir site and 5 HP diesel engine pump set , hire | pumpir | in lorry a ng the wat ker lorry, | nd convey er into the tools and o | reservo other ap | er from a di ir of height ppliences an | stance not less d cost o | of 5 km s than 3 m using | 5119.9 |
| 16 | 100.36 | Filling water with 5000 litre tanka (average) to the reservoir site and 5 HP diesel engine pump set , hire | pumpir | in lorry ang the wat | nd convey er into the | reservo | er from a di | stance not less | of 5 km s than 3 m using | 5119.9 |
| | | Filling water with 5000 litre tanke (average) to the reservoir site and | pumpir | in lorry ang the wat | nd convey er into the | reservo | er from a di | stance not less | of 5 km s than 3 m using | 5119.9 |
| | | Filling water with 5000 litre tanke | | in lorry a | nd convey | | er from a di | stance | of 5 km | 5119.9 |
| | | - | ers fited | | | ing wat |) | | | 5119.9 |
| | | | | | | | | | | 5110.0 |
| | | 0 | 9 | 0 | Ъ.Т. | | | No. | | |
| | | | 0 | | | | 0 | N 7 | | |
| | | nominal size) Complete as per des | sign | | | | | | | |
| | | 30x20x15 cm cement concrete blo | | | - | | | | | |
| | | permanent identification mark to | | | | | | | | |
| 15 | 19.16 | adequate anchoring projections of stand the bend test and chemical r | | | | | | | | |
| | | protruded legs having 2 mm tread | | | | | | | | |
| | | over all minimum length 263 mm | | | | | | | | |
| | | Providing orange colour safety fo on 12 mm dia steeel bar conformi | | | | | | | | |
| | | Say | | 0.45 | | |) | Rs | 1471.91 | 662.3 |
| | | Total | | | | | 0.45 | | | |
| | | | 1 | 0.45 | | | 0.45 | | | |
| 14 | | joints complete as per direction of | f Engine | eer in Cha | rge. 110m | m dia 6 | Kgf/cm ² - fo | r vent p | oipe | |
| | | Providing and fixing uPVC pipe | s & fitt | | | ting of | | | | |
| | | Say | 1 | 1 | No. | | | Rs | 1629.51 | 1629.5 |
| 13 | 1 | the cover to be not less than 23 Kg | 3 | | | | 1 | No. | | |
| 13 | | Supplying and fixing C.I. cover w the cover to be not less than 23 kg | | frame for | manholes | :455x6 | 10 mm recta | ingular | C.I. cover (light duty |) the weight of |
| | 10.10 | Say | | 48.9 | | | \cup | Rs | 269.90 | 13206.0 |
| | | Quantity after deductions | 1 | | | | 48.9 | m3 | | |
| | | Tank | 1 | 5.5 | 4.5 | 1 | 24.75 | m3 | | |
| | | Bottom slab | 1 | | | | 11.82 | m3 | | |
| | | PCC | 1 | | | | 4.5 | m3 | | |
| | | Deductions | | | | | | | | |
| | | Quantity as per item 1 | 1 | | | | 90 | m3 | | |

| | Quantity as per item code 13.7.1 | 1 | 94 | | | 0 | | 94.00 | |
|-------------------------|--|--|--|--|--|---|--|---|--|
| | Say | | | m2 | | (a) | Rs | 232.68 | 21871.48 |
| | Total Dilution Tank for Co Tr | eatment | | | | | | | 1274342.61 |
| COLLEC | FION TANK FOR CO TREAT | MENT - | rectangu | lar | | | | | |
| n Code | Description | No | L | В | Н | V | Unit | Rate | Amount |
| 1 2.6.1 | Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in | on plan |) including | | | | | | |
| | Shape of tank | 1 | (put 1 for | rectangul | ar and 2 | 2 for circula | r) | | |
| | Collection tank | 1 | 3.50 | 3.5 | 1.50 | 18.38 | m ³ | | |
| | Total | | | | | 18.38 | m ³ | | |
| | Say | | 18.38 | m ³ | | | | | |
| | Do for itemAll kinds of | 0.35 | 18.38 | | | 6.433 | @Rs | 223.41 | 1437.17 |
| | Do for itemOrdinay rock | 0.35 | 18.38 | | | 6.433 | @Rs | 433.01 | 2785.56 |
| | Medium rock with blasting | 0.15 | 18.38 | | | 2.757 | @Rs | 541.27 | 1492.27 |
| | Medium rock with out blasting | 0.15 | 10.20 | | | 0.757 | | 000.50 | 0.477.17 |
| | Earth work in excavation by mec | 0.15 | | | | 2.757 | | 898.50 | 2477.17 |
| | Collection tank | 1 | 3.50 | | 1.50 | 18.38 | m ³ | | |
| | Say | | 18.38 | m ³ | | | | | |
| | Do for itemAll kinds of | 0.25 | 18.38 | | | 4.595 | @Rs | 334.44 | 1536.73 |
| | Do for itemOrdinay rock | 0.25 | 18.38 | | | 4.595 | @Rs | 632.14 | 2904.70 |
| | Medium rock with blasting | 0.25 | 18.38 | | | 4.595 | @Rs | 740.40 | 3402.14 |
| | Medium rock with out blasting | 0.25 | 18.38 | | | 4.595 | @Rs | 1097.64 | 5043.64 |
| 2 4.1.6 | Providing and laying in position work up to plinth level : 1:3:6 (1 Collection tank | | | sand (zon | e-III): 6 | 5 graded stor | ie aggi | | |
| | Total | 1 | 5.50 | 5.5 | 0.15 | 1.84 | | | |
| - | Say | | 1.84 | m ³ | | | Rs | 7527.06 | 13849.79 |
| 5.37.1 + 3 5.34.1 | Providing and laying in position Resistant Cement (SRC) cont transported to site of work in trans- of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Collection tank Inverted beam Bottom slab cum raft Long wall | ent as j nsit mix cement shutter shutter decelerat the Eng per desig 2 2 1 2 2 | per approver for all l concrete v ing finish te/ retard s gineer-in-c gn mix is p 3 3 3.15 3.00 | ved desigg eads, havi work, inclu- ing and re- setting of d- harge. (No payable/rec 0.3 0.3 0.3 3.15 0.25 | n mix, ng cont uding p einforce concret ote :- coverab | manufactur inuous agita umping of I ement, inclu e, improve v Cement co le separately 1.08 1.08 4.47 3.75 | ed in tted mit X.M.C. ding c workat ntent of r). m^3 m^3 m^3 m^3 | fully automatic b xer, manufactured from transit mixe cost of admixture bility without impa | batching plant and as per mix design er to site of laying s in recommended airing strength and |
| | Short wall | 2 | 2.50 | 0.25 | 2.50 | 3.13 | m ³ | | |
| | Total | | | | | 13.51 | | | |
| | | | | | | | | | |

| | work, using Sulphate Resistant C | Cement (| SRC) cont | ent as per | approv | ed design m | ix man | ufactured in | |
|-----------|--|--|---|--|--|---|---|--|---|
| | fully automatic batching plant an | | | | | | | | |
| | continuous agitated mixer, manu | | | | | | | | |
| | concrete work, including pumpir | | | | | | | | |
| | centering, shuttering finishing an | - | | | | | | - | |
| | proportions as per IS : 9103 to ad | | | | | | | | |
| 5.37.2 | | | | | | | | | |
| + | considered in this item is @ 330 | | | | | | | | |
| 3a 5.34.1 | | Kg/J.LA | CESS/1ESS C | ement use | u as pei | uesign mix | . is paya | | |
| 5.54.1 | 1 57 | | | | | | | | |
| | Top Slab | l | 3.00 | 3.00 | 0.15 | 1.35 | | | |
| | Walk way | 2 | 6.00 | 0.45 | 0.10 | 0.54 | | | |
| | deduction-Manhole | 1 | 0.60 | 0.45 | 0.15 | 0.04 | | | |
| | Total after deduction | | | | | 1.85 | m ³ | | |
| - | Say | | 1.85 | m ³ | | | Rs | 12129.26 | 22439.1 |
| | Say | | 1.03 | 111 | | W | KS | 12129.20 | 22437.1 |
| | | | | | | | | | |
| 5.22.6 | Epoxy coated steel reinforceme | ent for 1 | R.C.C. wo | ork includ | ing stra | aightening, | cutting | , bending, placir | g in position an |
| | binding all complete upto plinth | | | | | | | | 0 1 |
| | Quantity as per item No.3 & 3a | 1 | | 15.36 | | | kg/m ³ | 1843.20 | kα |
| | ~ J I | - 1 | | 15.50 | | 120 | | | - |
| | Total | | 1010.0 | | | | | 1843.20 | 8 |
| _ | Say | | 1843.2 | kg | | (<i>a</i>) | Rs | 104.91 | 193368.7 |
| 5 4.12 | Extra for providing and mixing manufacturer's specification. | water p | proofing n | naterial in | cemen | t concrete v | vork in | doses by weight | t of cement as pe |
| 3 4.12 | | | | | 3 | | 1 / 3 | 5000 (0) | |
| _ | Quantity as per item No.3 & 3a | 1 | | 15.36 | m | 340 | kg/m³ | 5222.40 | - |
| | Total | | | | | | | 5222.40 | kg |
| | Say | | 104.448 | bags | | (a) | Rs | 70.77 | 7391.2 |
| | Centering and shuttering include | ling stru | itting nro | nning etc. | and re | emoval of | form fo | or Foundations | footings bases o |
| 6 5.9.1 | columns, etc. for mass concrete | ing suc | ating, pro | pping etc. | and it | | | i i oundations, | rootings, ouses c |
| 0 5.7.1 | , | 2 | (()) | | 0.45 | 5.94 | 2 | | |
| | Bottom slab | 2 | 6.60 | | 0.45 | | | | |
| | Beam side | 4 | 3 | | 1.20 | 14.40 | | | |
| | | 4 | 2.5 | | 1.20 | 12.00 | | | |
| | Total | | | | | 32.34 | m ² | | |
| | Say | | 32.34 | m^2 | | | Rs | 350.00 | 11319.1 |
| | | | | | | Ŭ | | | |
| | Centering and shuttering include | | | | and re | emoval of t | form fo | or :Walls (any th | ickness) includin |
| 7 5.9.2 | attached pilasters, butteresses, pl | inth and | string cou | rses etc. | | | | | |
| | For walls outside | 2 | 6.00 | | 2.50 | 30.00 | | | |
| | For walls inside | 2 | 5.00 | | 2.50 | 25.00 | m ² | | |
| | Total | | | | | 55.00 | m ² | | |
| | Say | | 55.00 | m^2 | | | Rs | 748.62 | 41174.2 |
| | Say | | 55.00 | | | u | K5 | /40.02 | 711/7,2 |
| 8 5.9.3 | Centering and shuttering includ balconies and access platform | ing strut | ting, prop | ping etc. | and rer | noval of fo | rm for | :Suspended floor | rs, roofs, landing |
| | Walk way | 2 | 6.90 | 0.5 | | 6.90 | | | |
| | Top slab | 1 | 12.00 | | 0.15 | 1.80 | | | |
| - | Bottom portion | 1 | 3.00 | 3 | | 9.00 | | | |
| - | - | 1 | 5.00 | 3 | | 9.00 | | | |
| _ | Total | | 15.50 | 2 | | | | 051 53 | 15051.0 |
| | Say | <u> </u> | 17.70 | | |) | Rs | 851.52 | 15071.8 |
| | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and the same from negative (interna specified in ACI 212-3R-2010 concrete as per DIN 1048 and | the base k etc., p 3 : 1 (3 j l) side w i.e by | ment, wat repared by parts integ vith the he reducing | er tanks, r y mixing i ral crystal lp of synt permeabi | oof slat n the ra line slu hetic fil lity of | os, podiums tio of 5 : 2 rry : 1 part ber brush. T concrete b | , reservi (5 part water) f The mat y more | ior, sewage & wa s integral crystall for horizontal sur erial shall meet t than 90% comp | ter treatment plan ine slurry : 2 par faces and applyin he requirements a pared with contro |
| 9 22.23. | capable of self-healing of cracks and the direction of the engine | s up to a er-in-ch | width of arge. The | 0.50mm. T | The wor | rk shall be c | arried | out all complete a | s per specification |

| | | m ² | 25 | 2.50 | | 5 | 2 | Inside of walls | |
|--|---|--|---|--|---|---|--|--|-------------|
| | | | 25 | | | | | Total | |
| 148 | 595.28 | Rs | <i>(a)</i> | | m ² | 25 | | Say | |
| itment to the ater treatment lline slurry : 2 rfaces and ap the requirement pared with c lline slurry sh as per specifi | terproofing treatm ior, sewage & wate s integral crystallin for horizontal surfa erial shall meet the than 90% compa- side. The crystallin out all complete as | for wa reserve (5 part water) t he mat more gative s arried of carry g | in nature s, podiums, io of 5 : 2 ry : 1 part v er brush. T concrete by sure on neg c shall be c | bof slab n the ra line slum netic fit lity of tic pres The wor | y of hydr er tanks, ro / mixing i ral crystal p of syntl permeabil r hydrosta 0.50mm. T product p | lline slurr ment, wate repared by parts integ ith the he reducing to 16 ba width of (arge. The | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 2 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine 2 leakage. For horizontal surface o Bottom slab inside | 22.23.2 |
| | | m ² | 6.25 | | | | | Total | |
| 28 | 458.77 | Rs | (a) | | m ² | 6.25 | | Say | |
|) 188 | 418.79 | m^2 m^2 m^2 | 25 6.25 13.8 45.05 @ | 2.50 | 2.5 1 m ² | 5.0 2.5 6.9 45.05 | 2 1 2 | Inside of walls Base slab inside Walkway Total Say | |
| | | 50 m | | | | | | Filling available excavated earth in depth, consolidating each depo Quantity as per item 1 | 2.25 |
| | | | | | | | | Deductions | |
| | | | 1.84 | | | | 1 | PCC | |
| | | | 6.63 | | | | 1 | Bottom slab | |
| | | | 22.50 | 2.5 | 3 | 3 | 1 | Tank | |
|) 15 | 269.90 | | 5.8 @ | | 3 | 5.8 | 1 | Quantity after deductions Say | |
| | | | 0 mm recta | :455x61 | | | | | 19.18. 1 |
| 16 | 1629.51 | Rs | @ | | No. | 1 | | Say | |
| cement , test | - | r vent p | Kgf/cm ² - for | | | er in Chai | | Providing and fixing uPVC pipe joints complete as per direction of | ŀ |
| | ├ ─── ├ | | 0.45 | | | 0.45 | 1 | T. (1 | <u> </u> |
| - | 1481.04 | | 0.45 | | | 0.45 | | Total | |
| . 6 | m x 25 mm and between | lated as s 23 m space b ss neces | ss section a n 112 mm s pring beside | num cro minimu r chequ | n 6 mm th ving minin mm with ribbing o 8 mm as p | :1786, hav lth as 165 surface by ngth on 13 | ing to IS and wic l on top n tail ler | Say Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of | 19.16 |
| | uitable to with actures es with | manufa nanhol | nd having i g fixing in r | ncludin | er fixing i | le even afi | be visib ock 1:3: | stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de | |
| 8 17 | uitable to with actures es with | manufa nanhol | nd having i g fixing in r 6 graded sto 3 | ncludin | er fixing i | le even afi 6 (1ceme | be visib ock 1:3: | permanent identification mark to 30x20x15 cm cement concrete bl | |

| | | Filling water with 5000 litre tanke | ers fited | in lorry a | nd convey | ing wat | er from a di | stance | of 5 km | |
|-----|---------|--|---|--|--|--|--|---|---|--|
| | | (average) to the reservoir site and | pumpir | ng the wat | er into the | reservo | oir of height | not les | s than 3 m using | |
| | | 5 HP diesel engine pump set , hire | e for tar | ker lorry, | tools and | other ap | opliences an | d cost o | of water etc. | |
| 16 | 100.36 | complete. | | | | 1 | | 1 | | |
| | | | 1 | 2.5 | 2.5 | 2 | 12.5 | m3 | | |
| | | total | | | | | 12.5 | | | |
| | | Say | | | Kilo litre | |) | Rs | 218.95 | 2736.84 |
| 17 | 10.26.2 | Providing and fixing hand rail of staircase railing and similar work | | | | | | | | |
| 1/ | 10.26.3 | stancase rannig and sinniar work | s, meru | nng appry | ing prinin | ig coat i | or approves | steer p | linet. | |
| | | 50mm dia G.I5.17kg/m , 32mm | ı dia GI- | 3.17kg/m | | | | | | |
| | | vertical 50mm dia | 14 | | | 0.75 | 5.17 | kg | 54.29 | |
| | | Horizontal 0.25m c/c-32mm dia | 3 | 13.8 | | | 3.17 | - | 131.24 | |
| | | Say | | 185.52 | kg | | | Rs | 194.18 | 36024.70 |
| | | Finishing with Deluxe Multi surfa | ace pain | | • | s and ex | ý | | er as per | |
| 1.0 | 12 40 2 | manufacturers specifications: | | | | | | | | |
| 18 | 13.48.3 | vertical pipe | 14 | 0.75 | | 0.05 | 0.525 | m2 | | |
| | | Horizontal pipe | 3 | 13.8 | | 0.03 | 1.3248 | | | |
| | | | 5 | 13.8 | | 0.05 | | Rs | 154 (2 | 286.02 |
| | | Say Finishing with Epoxy paint (two o | or more | | | s nrena | ÿ | | 154.62 | 280.02 |
| | | manufacturer's specifications incl | | | | | | | | |
| | | On concrete work | 0 | | 1 0 | 1 | 1 | | , <u>,</u> | |
| 19 | 13.52.2 | | 1 | | | | - | | | |
| | | | | | | | | | | |
| | | for wll inside & bottom slab | 1 | 31.25 | | | 0 | | 31.25 | |
| | | Say | | 31.25 | m2 | | a | Rs | 232.68 | 7271.10 |
| | | Total Collection Tank for Co T | reatme | nf | | | | | | 554757.65 |
| | | | | nt | | | | | | 554757.05 |
| | | CLARIFIER | | | _ | [| | | | |
| | | CLARIFIER Description | No | L | B | H | V | | Rate | Amount |
| | | CLARIFIER Description Earth work in excavation by mecl | No hanical | L means (Hy | draulic ex | cavato | r)/manual m | eans ov | ver areas (exceedi | Amount ng 30 cm in depth, |
| m | Code | CLARIFIER Description | No hanical on plan | L means (Hy | draulic ex | cavato | r)/manual m | eans ov | ver areas (exceedi | Amount ng 30 cm in depth, |
| m | | CLARIFIER Description Earth work in excavation by mecl 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- | No hanical on plan | L means (Hy) including | draulic ex g getting o | cavator ut and c | r)/manual m lisposal of e | eans ov excavat | ver areas (exceedi | Amount ng 30 cm in depth, |
| m | Code | CLARIFIER Description Earth work in excavation by mech 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier | No hanical on plan | L means (Hy) including 12.4 | vdraulic ex g getting o 12.4 | cavato | r)/manual m | eans ov excavat | ver areas (exceedi | Amount ng 30 cm in depth, |
| m | Code | CLARIFIER Description Earth work in excavation by mech 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier Say | No hanical on plan -charge 1 | L means (Hy) including 12.4 230.64 | vdraulic ex g getting o 12.4 | cavator ut and c | r)/manual m lisposal of e 230.64 | eans ov excavat m ³ | ver areas (exceedi ed earth lead upto | Amount ng 30 cm in depth, 50 m and lift upto |
| m | Code | CLARIFIER Description Earth work in excavation by mech 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier Say Do for itemAll kinds of | No hanical on plan -charge 1 0.35 | L means (Hy) including 12.4 230.64 230.64 | vdraulic ex g getting o 12.4 | cavator ut and c | r)/manual m disposal of e 230.64 80.724 | eans ov excavat m ³ @Rs | ver areas (exceedi ed earth lead upto 223.41 | Amount ng 30 cm in depth, 50 m and lift upto 18034.15 |
| m | Code | CLARIFIER Description Earth work in excavation by mech 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier Say Do for itemAll kinds of Do for itemOrdinay rock | No hanical on plan -charge 1 0.35 0.35 | L means (Hy) including 12.4 230.64 230.64 | ydraulic ex g getting o 12.4 m ³ | cavator ut and c | r)/manual m disposal of e 230.64 80.724 80.724 | m ³ @Rs @Rs | ver areas (exceedi ed earth lead upto 223.41 433.01 | Amount ng 30 cm in depth, 50 m and lift upto 18034.15 34954.38 |
| m | Code | CLARIFIER Description Earth work in excavation by mech 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier Say Do for itemAll kinds of Do for itemOrdinay rock Medium rock with blasting | No hanical on plan -charge 1 0.35 0.35 0.15 | L means (Hy) including 12.4 230.64 230.64 230.64 | ydraulic ex g getting o 12.4 m ³ | cavator ut and c | r)/manual m disposal of e 230.64 80.724 80.724 34.596 | m ³ @Rs @Rs @Rs | ver areas (exceedi ed earth lead upto 223.41 433.01 541.27 | Amount ng 30 cm in depth, 50 m and lift upto 18034.15 34954.38 18725.68 |
| m | Code | CLARIFIER Description Earth work in excavation by meel 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier Say Do for itemAll kinds of Do for itemOrdinay rock Medium rock with blasting Medium rock with out blasting | No hanical on plan -charge 1 0.35 0.35 0.15 0.15 | L means (Hy) including 230.64 230.64 230.64 230.64 230.64 | ydraulic ex g getting o 12.4 m ³ | 1.5 | r)/manual m lisposal of e 230.64 80.724 80.724 34.596 34.596 | m ³ @Rs @Rs @Rs @Rs | ver areas (exceedi ed earth lead upto 223.41 433.01 541.27 898.50 | Amount ng 30 cm in depth, 50 m and lift upto 18034.15 34954.38 18725.68 31084.62 |
| m | Code | CLARIFIER Description Earth work in excavation by meel 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier Say Do for itemAll kinds of Do for itemOrdinay rock Medium rock with blasting Medium rock with out blasting Earth work in excavation by meel | No hanical on plan -charge 1 0.35 0.35 0.15 0.15 hanical | L means (Hy) including 230.64 230.64 230.64 230.64 230.64 means (Hy | vdraulic ex g getting o 12.4 m ³ vdraulic ex | 1.5 | r)/manual m lisposal of e 230.64 80.724 80.724 34.596 34.596 34.596 | m ³ (a)Rs | ver areas (exceedi ed earth lead upto 223.41 433.01 541.27 898.50 ver areas (exceedi | Amount ng 30 cm in depth, 50 m and lift upto 18034.15 34954.38 18725.68 31084.62 ng 30 cm in depth, |
| m | Code | CLARIFIER Description Earth work in excavation by meel 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- For clarifier Say Do for itemAll kinds of Do for itemOrdinay rock Medium rock with blasting Medium rock with out blasting | No hanical on plan -charge 1 0.35 0.35 0.15 0.15 hanical on plan | L means (Hy) including 230.64 230.64 230.64 230.64 230.64 230.64) including | vdraulic ex g getting o 12.4 m ³ vdraulic ex | 1.5 | r)/manual m lisposal of e 230.64 80.724 80.724 34.596 34.596 34.596 | m ³ (a)Rs | ver areas (exceedi ed earth lead upto 223.41 433.01 541.27 898.50 ver areas (exceedi | Amount ng 30 cm in depth, 50 m and lift upto 18034.15 34954.38 18725.68 31084.62 ng 30 cm in depth, |
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| | | | 4/./4 | | | u | 13 | 10404.77 | 470040. |
| walls ci | xcess/less cement used as p ircular ab with inverted beam | 1 1 | n mix is p 10.27 102.02 | ayable/rec | 3.4 0.2 | 34.91 20.40 | | ve piintn ievel. | |
| Walk w | | 1 | 36.58 | 0.45 | 0.10 | 1.65 | | | |
| Total | vay | 1 | 50.50 | 0.43 | 0.10 | 56.96 | m ³ | | |
| Say | | | 56.96 | m ³ | | | Rs | 12142.28 | 691629. |
| | | | 50.70 | | | u | 13 | 12142.20 | 0)102). |
| 5.22.6 | | | | | | | | | |
| 5.22.6 +OD1 Epoxy 5 6 binding | coated steel reinforceme g all complete upto plinth | ent for l level. Th | R.C.C. wo ermo-Meo | chanically | Freated | l bars of gra | de Fe-5 | 00D or more. | |
| 5 +OD1 Epoxy binding | coated steel reinforceme g all complete upto plinth ty as per item No.3 | ent for l level. Th | R.C.C. wo ermo-Mec | hanically 47.94 | Γreated m ³ | l bars of gra 120 | de Fe-5 kg/m ³ | 500D or more. 5753.28 | kg |
| +OD1 Epoxy 5 6 Quantit | g all complete upto plinth | ent for I level. Th 1 | R.C.C. wo | chanically | Γreated m ³ | l bars of gra 120 | de Fe-5 | 00D or more. 5753.28 6835.25 | kg kg |
| +OD1 Epoxy 5 6 Quantit Quantit Quantit | g all complete upto plinth ty as per item No.3 | level. Th | ermo-Mec | 2 hanically 47.94 56.96 | Γreated m ³ | l bars of gra 120 120 | de Fe-5 kg/m ³ kg/m ³ | 00D or more. 5753.28 6835.25 12588.52 | kg kg kg |
| +OD1 Epoxy 5 6 Quantit | g all complete upto plinth ty as per item No.3 | level. Th | R.C.C. wc ermo-Mec 12588.5 | 2 hanically 47.94 56.96 | Γreated m ³ | l bars of gra 120 120 | de Fe-5 kg/m ³ | 00D or more. 5753.28 6835.25 | kg kg |
| +OD1 Epoxy 5 6 Quantit Quantit Quantit I Quantit Total Say 6 4.12 Extra for manufa | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. | level. Th | ermo-Mec 12588.5 | hanically 47.94 56.96 kg naterial in | reated m ³ m ³ | l bars of gra 120 120 (@) t concrete v | de Fe-5 kg/m ³ kg/m ³ Rs vork in | 00D or more. 5753.28 6835.25 12588.52 104.91 doses by weight | kg kg 1320652. t of cement as p |
| +OD1 Epoxy 5 6 Quantit Quantit Quantit I Quantit I Total Say Extra fo manufa | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. ty as per item No.3 | level. Th | ermo-Mec 12588.5 | hanically 47.94 56.96 kg naterial in 47.94 | reated m ³ m ³ cement m3 | l bars of gra 120 120 (@) t concrete v 340 | de Fe-5 kg/m ³ kg/m ³ Rs vork in kg/m ³ | 00D or more. 5753.28 6835.25 12588.52 104.91 doses by weight 16300.95 | kg kg 1320652. t of cement as p |
| +OD1 Epoxy 5 6 binding Quantit Quantit 1 Total 2 Say 6 4.12 Extra for manufa Quantit Quantit 4 Quantit | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. | level. Th | ermo-Mec 12588.5 | hanically 47.94 56.96 kg naterial in | reated m ³ m ³ cement m3 | l bars of gra 120 120 (@) t concrete v 340 | de Fe-5 kg/m ³ kg/m ³ Rs vork in | 600D or more. 5753.28 6835.25 12588.52 104.91 doses by weight 16300.95 19366.53 | kg kg 1320652. t of cement as p kg kg |
| +OD1 Epoxy 5 6 Quantit Quantit Quantit Total Say 4.12 Extra fa manufa Quantit Quantit Quantit | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. ty as per item No.3 | level. Th | 12588.5 proofing n | hanically 47.94 56.96 kg haterial in 47.94 56.96 | reated m ³ m ³ cement m3 | l bars of gra 120 120 (@) t concrete v 340 340 | de Fe-5 kg/m ³ kg/m ³ Rs vork in kg/m ³ | 500D or more. 5753.28 6835.25 12588.52 104.91 doses by weight 16300.95 19366.53 35667.48 | kg kg 1320652. t of cement as p kg kg |
| +OD1 Epoxy 5 6 Quantit Quantit Quantit I Total Say Extra f manufa Quantit Quantit Quantit Quantit I Total Say | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. ty as per item No.3 ty as per item No.4 | level. Th | ermo-Mec 12588.5 proofing m 713.35 | hanically 47.94 56.96 kg haterial in 47.94 56.96 bags | rreated m ³ m ³ cement m3 m3 | l bars of gra 120 120 (@) t concrete v 340 340 (@) | de Fe-5 kg/m ³ kg/m ³ Rs vork in kg/m ³ Rs | 600D or more. 5753.28 6835.25 12588.52 104.91 doses by weight 16300.95 19366.53 35667.48 70.77 | kg kg 1320652. t of cement as p kg kg kg 50480. |
| +OD1 Epoxy 5 6 binding Quantit Quantit I Total I Say 6 4.12 Extra f Manufa Quantit Quantit Quantit I Quantit Quantit Quantit I Total I Quantit I Quantit I Total I Contentit I Say I Say I Say | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. ty as per item No.3 ty as per item No.4 ing and shuttering includ is, etc. for mass concrete | level. Th | 12588.5 proofing n 713.35 tting, proj | hanically 47.94 56.96 kg haterial in 47.94 56.96 bags | rreated m ³ m ³ cement m3 m3 and re | l bars of gra 120 120 (@) t concrete v 340 340 (@) emoval of t | de Fe-5 kg/m ³ kg/m ³ Rs vork in kg/m ³ kg/m ³ Rs | 600D or more. 5753.28 6835.25 12588.52 104.91 doses by weight 16300.95 19366.53 35667.48 70.77 | kg kg 1320652. t of cement as p kg kg kg 50480. |
| +OD1 Epoxy 5 6 binding Quantit Quantit I Total I Say I Extra formanufa I Quantit Quantit Quantit I Quantit I Quantit I Quantit I Total I Quantit I Say I Say I Say I Say I Centerin I Circula | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. ty as per item No.3 ty as per item No.4 ing and shuttering includ ns, etc. for mass concrete ar | level. Th | ermo-Mec 12588.5 proofing n 713.35 tting, proj 36.11 | hanically 47.94 56.96 kg haterial in 47.94 56.96 bags | rreated m ³ m ³ cement m3 m3 and ro 0.45 | 1 bars of gra 120 120 (@) 120 120 120 120 120 120 120 120 | de Fe-5 kg/m ³ kg/m ³ Rs vork in kg/m ³ Rs form fo m ² | 600D or more. 5753.28 6835.25 12588.52 104.91 doses by weight 16300.95 19366.53 35667.48 70.77 | kg kg 1320652. t of cement as p kg kg kg 50480. |
| +OD1 Epoxy binding 6 Quantit I Quantit I Total I Total I Extra for manufa Quantit Quantit I I Quantit Quantit Quantit I I Quantit I Total Quantit I I Quantit I I Total I I Quantit I I Contal I I Contal I I Contal I I Say I I Contal I I Say I I Say I I Say I I Contal I I Say I I Say I I Say | g all complete upto plinth ty as per item No.3 ty as per item No.4 for providing and mixing acturer's specification. ty as per item No.3 ty as per item No.4 ing and shuttering includ is, etc. for mass concrete | level. Th | 12588.5 proofing n 713.35 tting, proj | hanically 47.94 56.96 kg haterial in 47.94 56.96 bags | rreated m ³ m ³ cement m3 m3 and re | l bars of gra 120 120 (@) t concrete v 340 340 (@) emoval of t | de Fe-5 kg/m ³ kg/m ³ Rs vork in kg/m ³ Rs form for m ² m ² | 600D or more. 5753.28 6835.25 12588.52 104.91 doses by weight 16300.95 19366.53 35667.48 70.77 | kg kg 1320652. t of cement as p kg kg kg 50480. |

| | | m2 | 18.29 | 0.5 | 36.58 | 1 | Walkway | |
|---|--|---|--|---|---|--|---|---------------------|
| | | m ² | 314.86 | | | | Total | |
| 110201.0 | 350.00 | Rs | <i>a</i> | | 314.86 | | Say | |
| treatment plan e slurry : 2 par es and applyin requirements a ed with contrr e slurry shall b per specification | ior, sewage & wat is integral crystalli for horizontal surf terial shall meet th than 90% comp side. The crystalli out all complete a | reserv (5 part water) The mat more gative | os, podiums, ntio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne rk shall be c | ks, roof slat ing in the ra ystalline slu synthetic fil neability of rostatic pre- nm. The wor- luct perform | ment, wate repared by parts integrith the hel reducing to 16 bar width of (arge. The | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-ch | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 2 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two | 8 22.23.1 |
| | | m ² | 114.2332 | 3.4 | 33.60 | 1 | Inside of walls | |
| | | | 114.23 | | | | Total | + |
| 68000.1 | 595.28 | Rs | (<i>a</i>), | | 114.23 | | Say | + |
| treatment plan e slurry : 2 par es and applyin requirements a ed with contra e slurry shall b per specification | ior, sewage & wat is integral crystalli for horizontal surf teerial shall meet th than 90% comp side. The crystalli out all complete a guarantee for 10 528.47 | reserv (5 part water) : 'he mat y more gative : carry g m^2 m^2 m^2 Rs t : 3 fin | os, podiums, atio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg rk shall be c nance shall 89.87 89.87 (2) (2) (3) (1 cemen | ks, roof slat ing in the ra ystalline slu synthetic fil neability of rostatic pre nm. The wor luct perform m. at cement :1 | ment, wate repared by parts integu ith the hel reducing to 16 bar width of (arge. The 21.10 kg p 89.87 89.87 | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-ch ne coat (1 | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w | |
| | | | 114.23 | 3.4 | 33.60 | 1 | Inside of walls | |
| | | m ² | 89.87 | | 89.87 | 1 | Base slab inside | |
| | | | 84.40 | 2.4 | 35.17 | 1 | Outside of walls | <u> </u> |
| | | 2 | 36.58 | 1 | 36.58 | 1 | Walkway | ┥── |
| | | | 325.09 | | | | Total | ┥── |
| 136144.4 | | |) | m thick pla | 325.09 f minimur | ot rest o | Say Providing orange colour safety for | + |
| | between ssary and uitable to with actures es with | space b es neces g and s manufa manhol | oss section a im 112 mm s iering beside dard drawing and having in ing fixing in i | ninimum cro with minimu ing or chequ a as per stand ecifications king includir | Ith as 165 surface by ngth on 13 ce test as p le even aft | ing to IS and wid l on top n tail ler resistand be visib ock 1:3: | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete b nominal size) Complete as per de | 1 19.16 |
| | between ssary and uitable to with actures es with | space b es neces g and s manufa manhol | oss section a m 112 mm s hering beside dard drawin and having ng fixing in 6 graded sto | ninimum cro with minimu ing or chequ a as per stand ecifications king includir | Ith as 165 surface by ngth on 13 ce test as p le even aft | ing to IS and wid l on top n tail ler resistand be visib ock 1:3: | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete b | 1 19.16 |
| 5688.8 | between ssary and uitable to with ictures es with gregate 20 mm 568.88 of 5 km s than 3 m using | space bes neces g and s manufa manhol one agg No. Rs stance not less | biss section a im 112 mm sinering beside dard drawing and having in fixing in n 6 graded stur- 10 @ er from a di bir of height | ninimum cre with minimu ing or chequ a as per stan ecifications cing includir coarse sand: | Ith as 165 surface by ogth on 132 te test as p le even aft 6 (1cemen 10 in lorry ar og the wate | ing to IS and wid on top n tail len resistand be visib ock 1:3: sign 10 ers fited pumpin | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete b nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hin complete | |
| 5688.8 | between ssary and uitable to with ictures es with gregate 20 mm 568.88 of 5 km s than 3 m using | space b ss neces g and s manufa manhol one agg No. Rs stance not less d cost o | oss section a im 112 mm : iering beside dard drawin, and having : ing fixing in i 6 graded stu 10 @ ier from a di pir of height ppliences and | ninimum cre with minimu ing or chequ as per stan- ecifications cing includir coarse sand: nveying wat o the reserve and other ap | Ith as 165 surface by ogth on 133 se test as p le even aft 6 (1cemen 10 in lorry ar og the wate ker lorry, 1 | ing to IS and wid on top n tail len resistand be visib ock 1:3: sign 10 ers fited pumpin | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete b nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hin complete | 1 19.16 2 100.36 |
| 5688.8 | between ssary and uitable to with ictures es with gregate 20 mm 568.88 of 5 km s than 3 m using | space b ss neces g and s manufa manhol one agg No. Rs stance not less d cost o | biss section a im 112 mm sinering beside dard drawing and having in fixing in n 6 graded stur- 10 @ er from a di bir of height | ninimum cre with minimu ing or chequ a as per stan ecifications cing includir coarse sand: | Ith as 165 surface by ogth on 132 te test as p le even aft 6 (1cemen 10 in lorry ar og the wate | ing to IS and wid on top n tail len resistand be visib ock 1:3: sign 10 ers fited pumpin | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete b nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hin complete | |

| | | Providing and fixing hand rail of | | | | | | | | |
|---------|----------------------|--|--|---|---|--|--|---|---|---|
| 13 | 10.26.3 | staircase railing and similar work | s, inclue | ling apply | ing primin | ig coat | of approves | steel p | rimer. | |
| | | 50mm dia G.I5.17kg/m , 32mm | n dia GI- | -3.17kg/m | | | | | | |
| | | vertical 50mm dia | 37 | | | 0.75 | 5.17 | kg | 143.47 | |
| | | Horizontal 0.25m c/c-32mm dia | 3 | 36.5 | | | 3.17 | - | 347.12 | |
| | | Say | | 490.583 | kg | | (a) | Rs | 194.18 | 95260.90 |
| | | Finishing with Deluxe Multi surfa | ace pain | t system f | or interiors | s and ex | teriors using | g prim | er as per | |
| 14 | 13.48.3 | manufacturers specifications: | | | | | | | | |
| | | vertical pipe | 37 | 0.75 | | 0.05 | 1.3875 | m2 | | |
| | | Horizontal pipe | 3 | 36.5 | | 0.03 | 3.504 | m2 | | |
| | | Say | | 4.89 | | | 0 | Rs | 154.62 | 756.33 |
| 15 | 13.52.2 | Finishing with Epoxy paint (two manufacturer's specifications incl On concrete work | | | | | | | | |
| | | Base slab & inside walls | 1 | 204.11 | | | 0 | | 204.11 | |
| | | Say | | 204.108 | m2 | | a | Rs | 232.68 | 47490.86 |
| | | Total-Primary Clarifier | | | | | | | | 3681527.21 |
| ИО | VING | BED BIOFILM REACTOR TA | NK-BO | DD REMO | OVAL | | | | | |
| n No | Item Code | Description | No | L | в | Н | v | Unit | Rate | Amount |
| | | Shape of tank | 1 | (put 1 for | rectangul | ar and 2 | 2 for circular | r) | | |
| | | Earth work in excavation by mec | | | | | | | | |
| 1 | 2.6.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in | on plan |) including | g getting o | ut and o | disposal of e | xcavat | | |
| 1 | 2.6.1 | 1.5 m in width as well as 10 sqm1.5 m, as directed by Engineer-inMBBR Tank-base | on plan | | | | disposal of e | xcavat m ³ | | |
| 1 | 2.6.1 | 1.5 m in width as well as 10 sqm1.5 m, as directed by Engineer-inMBBR Tank-baseTotal | on plan |) including | g getting o | ut and o | disposal of e 45 45 | m ³ m ³ | ed earth lead upto | 50 m and lift upto |
| 1 | 2.6.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say | on plan -charge |) including 10.00 45 | g getting o 10 m ³ | 0.45 | 45 45 0 0 | xcavat m ³ m ³ Rs | 223.41 | 0 50 m and lift upto |
| | | 1.5 m in width as well as 10 sqm1.5 m, as directed by Engineer-inMBBR Tank-baseTotal | on plan -charge 1 stone i |) including 10.00 45 | g getting o 10 m ³ | 0.45 | 45 45 0 0 | xcavat m ³ m ³ Rs | 223.41 | 0 50 m and lift upto |
| 1 | 2.6.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 | on plan a-charge |) including 10.00 45 n foundati | g getting o 10 m ³ on and pl | ut and c 0.45 | disposal of e 45 45 @ cluding level | m ³ m ³ Rs ling up | 223.41 | 0 50 m and lift upto |
| | | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base | on plan -charge 1 stone i |) including 10.00 45 | g getting o 10 m ³ | ut and c 0.45 | disposal of e 45 45 @ luding level 45 | m ³ m ³ Rs ling up m ³ | 223.41 | 0 50 m and lift upto |
| | | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total | on plan a-charge |) including 10.00 45 n foundati 10.00 | g getting o 10 m ³ ion and pla 10 | ut and c 0.45 | 45 45 45 (luding level 45 45 45 | xcavat m ³ m ³ Rs ling up m ³ m ³ | 223.41 | 10053.23 10053.23 |
| | | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base | on plan a-charge |) including 10.00 45 n foundati 10.00 | g getting o 10 m ³ on and pl | ut and c 0.45 | 45 45 45 (luding level 45 45 45 | m ³ m ³ Rs ling up m ³ | 223.41 | 0 50 m and lift upto |
| | 7.1.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position | on plan -charge 1 stone i :6 1 cement |) including 10.00 45 n foundati 10.00 45 concrete | g getting o 10 m ³ fon and pl 10 m ³ of specifi | 0.45 0.45 0.45 0.45 ed grad | disposal of e 45 45 00 cluding level 45 45 00 e excluding | m ³ m ³ Rs ling up m ³ Rs the co | 223.41 223.41 p with cement con 7520.41 post of centering a | 10053.23 10053.23 nerete 1:6:12 up to 338418.4(nd shuttering - Al |
| | | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) | on plan -charge 1 stone i :6 1 cement |) including 10.00 45 n foundati 10.00 45 concrete | g getting o 10 m ³ fon and pl 10 m ³ of specifi | 0.45 0.45 0.45 0.45 ed grad e-III): 6 | 45 45 00 00 00 00 00 00 00 00 00 00 00 00 00 | m ³ m ³ Rs ling up m ³ Rs the cone aggr | 223.41 223.41 p with cement con 7520.41 post of centering a | 10053.23 10053.23 nerete 1:6:12 up to 338418.4(nd shuttering - Al |
| 2 | 7.1.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base | on plan -charge 1 stone i :6 1 cement |) including 10.00 45 n foundati 10.00 45 concrete | g getting o 10 m ³ fon and pl 10 m ³ of specifi | 0.45 0.45 0.45 0.45 ed grad e-III): 6 | 45 45 45 00 cluding level 45 45 45 45 00 le excluding 5 graded stor 15 | m ³ m ³ Rs ling up m ³ Rs the cone aggr m ³ | 223.41 223.41 p with cement con 7520.41 post of centering a | 10053.23 10053.23 nerete 1:6:12 up to 338418.40 nd shuttering - Al |
| 2 | 7.1.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total | on plan -charge 1 stone i :6 1 cement |) including 10.00 45 n foundati 10.00 45 concrete : 3 coarse 10.00 | g getting o 10 m ³ on and pla 10 m ³ of specifi sand (zon 10 | 0.45 0.45 0.45 0.45 ed grad e-III): 6 | disposal of e | m ³ m ³ Rs ling up m ³ Rs the co he aggr m ³ m ³ | 223.41 223.41 p with cement con 7520.41 post of centering a | 10053.23 10053.23 nerete 1:6:12 up to 338418.40 nd shuttering - Al |
| 2 | 7.1.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total Say | on plan i-charge 1 stone i :6 1 cement Cement 1 1 |) including 10.00 45 n foundati 10.00 45 concrete : 3 coarse 10.00 15 | g getting o 10 m ³ on and pl 10 m ³ of specifi sand (zon 10 m ³ m ³ | 0.45 inth inc 0.45 ed grad e-III): 6 0.15 | 45 45 45 6 1 1 1 1 5 1 5 1 6 1 5 1 6 1 5 1 6 1 7 1 5 1 6 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7 | m ³ m ³ Rs ling up m ³ Rs the co he aggr m ³ m ³ Rs | 223.41 223.41 2 with cement con 7520.41 2 ost of centering a regate 40 mm nom 7527.06 | 10053.2; 10053.2; nerete 1:6:12 up to 338418.40 nd shuttering - Al ninal size) 112905.9; |
| 2 | 7.1.1 | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total | on plan a-charge 1 stone i :6 1 cement Cement Cement 1 ready r ent as p nsit mix cement shutter accelerat the Eng |) including 10.00 45 n foundati 10.00 45 concrete : 3 coarse 10.00 15 nixed M-3 per appro- er for all l concrete v ing finish te/ retard s gineer-in-c gn mix is p | g getting o 10 m ³ on and pl 10 m ³ of specifi sand (zon 10 m ³ 0 grade c ved design eads, havi work, inclu- ing and re- setting of e harge. (No ayable/rec | 0.45 0.45 0.45 ed grade e-III): 6 0.15 0.1 | disposal of e 45 45 45 45 45 45 45 45 45 45 | m ³ m ³ Rs ling up m ³ Rs the cone aggr m ³ Rs the cone aggr m ³ Rs Rs cone aggr m ³ Rs cone aggr r cone aggr r cone aggr r cone aggr Rs cone aggr r cone cone cone cone cone cone cone cone | 223.41 223.41 223.41 20 with cement con 7520.41 7520.41 ost of centering a regate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture pility without imp | 10053.22 10053.22 nerete 1:6:12 up to 338418.40 ad shuttering - Al inal size) 112905.91 rk, using Sulphato batching plant and a sper mix designer to site of laying s in recommended airing strength and |
| 3 | 7.1.1 4.1.6 5.37.1 + | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/³.Excess/less cement used as p Base slab | on plan a-charge 1 stone i :6 1 cement Cement Cement 1 ready r ent as p nsit mix cement shutter accelerat the Eng |) including 10.00 45 n foundati 10.00 45 concrete 3 coarse 10.00 15 nixed M-3 per approver for all 1 concrete ving finish te/ retard s gineer-in-c gn mix is p 10.00 | g getting o 10 m ³ on and pl 10 m ³ of specifi sand (zon 10 m ³ 30 grade c ved design eads, havi work, incluing and re setting of of charge. (N payable/rec 10 | 0.45 0.45 0.45 ed grace e-III): 6 0.15 0.1 | disposal of e 45 45 45 45 45 45 45 45 45 45 | m ³ m ³ Rs ling up m ³ Rs the cone aggr m ³ Rs the cone aggr m ³ Rs Rs cone aggr m ³ Rs cone aggr r cone aggr r cone aggr r cone aggr Rs cone aggr r cone cone cone cone cone cone cone cone | 223.41 223.41 223.41 20 with cement con 7520.41 7520.41 ost of centering a regate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture pility without imp | 10053.22 nerete 1:6:12 up to 338418.40 nd shuttering - Al ninal size) 112905.91 rk, using Sulphato batching plant and a sper mix design r to site of laying s in recommended airing strength and |
| 3 | 7.1.1 4.1.6 5.37.1 + | 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in MBBR Tank-base Total Say Random rubble masonry in hard plinth level with cement mortar 1 MBBR Tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) MBBR tank-base Total Say Providing and laying in position Resistant Cement (SRC) context transported to site of work in trans of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/³.Excess/less cement used as provident and the set of the | on plan a-charge 1 stone i :6 1 cement Cement Cement 1 ready r ent as p nsit mix cement shutter accelerat the Eng per desig |) including 10.00 45 n foundati 10.00 45 concrete : 3 coarse 10.00 15 nixed M-3 per appro- er for all l concrete v ing finish te/ retard s gineer-in-c gn mix is p | g getting o 10 m ³ on and pl m ³ of specifi sand (zon 10 m ³ 0 grade c ved design eads, havi work, inclu- ing and ro- setting of o charge. (No ayable/reco 10 11.9 | 0.45 0.45 0.45 ed grad e-III): 6 0.15 | disposal of e 45 45 45 45 45 45 45 45 45 45 | m ³ m ³ Rs ling up m ³ Rs the cone aggr m ³ Rs the cone aggr m ³ Rs Rs cone aggr m ³ Rs cone aggr r cone aggr r cone aggr r cone aggr Rs cone aggr r cone cone cone cone cone cone cone cone | 223.41 223.41 223.41 20 with cement con 7520.41 7520.41 ost of centering a regate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture pility without imp | 10053.23 nerete 1:6:12 up to 338418.40 nd shuttering - Al ninal size) 112905.91 rk, using Sulphato batching plant and a sper mix design r to site of laying s in recommended airing strength and |

| | | Columns | 16 | 0.35 | 0.35 | 1 | 1.96 | | | |
|----|-------------|--|---|--|---|---|--|---|--|---|
| | | Total | 10 | 0.00 | 0.50 | | 117.73 | | | |
| | | Say | | 117.727 | m ³ | | | Rs | 10404.79 | 1224919.54 |
| | | Providing and laying in position | readv m | | | ncrete f |) | | | 122171715 |
| | | work, using Sulphate Resistant C | - | | - | | | | | |
| | | fully automatic batching plant an | | | - | | - | | | |
| | | continuous agitated mixer, manuf | | - | - | - | - | | | |
| | | concrete work, including pumpin | | | | | | | | |
| | | centering, shuttering finishing an | | | - | | | | | |
| | | proportions as per IS : 9103 to ac impairing strength and durability | | | - | | - | | - | |
| | 5.37.2 + | considered in this item is @ 330 | - | | - | | | | | |
| 4a | 5.34.1 | separately). | ng J.EA | | ement use | a as per | uesign mix | is puy | | |
| | | 1 57 | | 1 - 60 | | | 10.00 | 3 | | |
| | | Tank walls | 2 | 17.60 | 0.30 | 4.10 | 43.30 | m | | |
| | | Walkway | 4 | 11.45 | 0.45 | 0.10 | 2.06 | | | |
| | | Total | | | | | 45.36 | m ³ | | |
| | | Say | | 45.36 | m ³ | | | Rs | 12129.26 | 550146.96 |
| | 5.22.6 | | | | | | | | | |
| | +OD1 | Epoxy coated steel reinforceme | | | | | | | | ng in position and |
| 5 | 6 | binding all complete upto plinth l | | ermo-Meo | | | | 2 | | |
| | | Quantity as per item No.4&4a | 1 | | 243.81 | m | 120 | kg/m' | 29257.20 | |
| | | Total | | | | | | | 29257.20 | <u> </u> |
| | | Say | | 29257.2 | | | - | Rs | 104.91 | 3069350.91 |
| 6 | 4.12 | Extra for providing and mixing manufacturer's specification. | water p | proofing n | naterial in | cemen | t concrete v | vork in | doses by weight | t of cement as per |
| 0 | 4.12 | Quantity as per item No.4&4a | 1 | | 243.81 | m ³ | 240 | kg/m ³ | 82895.40 | ka |
| | | Total | 1 | | 245.01 | | 540 | к <u>ө</u> /Ш | 82895.40 | - |
| | | Say | | 1657.91 | bage | | Ø | Rs | 7 0.7 7 | 117321.86 |
| | | | | | | | | | | |
| 7 | 5.9.1 | Centering and shuttering includ columns, etc. for mass concrete | ing stru | tting, pro | pping etc. | and r | | | or :Foundations, | footings, bases of |
| | | Bottom slab | 2 | 18.20 | | 0.35 | 12.74 | m ² | | |
| | | Beam | 8 | 11.65 | | 1.3 | 121.16 | | | |
| | | Column | 16 | 1.40 | | 1 | 22.40 | | | |
| | | Total | | | | | 156.30 | m ² | | |
| | | Say | | 156.30 | m ² | | a | Rs | 350.00 | 54705.58 |
| 8 | 5.9.2 | Centering and shuttering includ attached pilasters, butteresses, pli | - | | | and re | emoval of f | form fo | or :Walls (any th | ickness) including |
| | | For walls outside | 2 | 18.20 | | 4.10 | 149.24 | m ² | | |
| | | For walls inside | 2 | 17.00 | | 4.10 | 139.4 | | | |
| | | Walk way | 4 | 11.45 | | | 22.9 | | | |
| | | Total | | | | | 311.54 | m ² | | |
| | | Say | | 311.54 | m ² | | | Rs | 748.62 | 233225.99 |
| 0 | 22 23 1 | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 2 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-ch | ment, wat repared b parts integ ith the he reducing to 16 ba width of arge. The | er tanks, r y mixing i gral crystal lp of synt permeabi r hydrosta 0.50mm. product | oof slat n the ra line slu hetic fil lity of ttic pre- | os, podiums, atio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne rk shall be c | reserv (5 part water) The mat more gative carried | ior, sewage & wa is integral crystall for horizontal sur terial shall meet t than 90% comp side. The crystall out all complete a | ter treatment plant, ine slurry : 2 parts faces and applying he requirements as pared with control ine slurry shall be as per specification |

| 2 17.00 | Inside of walls | 4.10 | 139.40 | | | |
|--|--|--|--|--|--|---|
| | Total | | 139.40 | m ² | | |
| 139.40 m ² | Say | | @ | Rs | 595.28 | 82981.3 |
| the basement, water ta k etc., prepared by m 3 : 1 (3 parts integral b) side with the help of i.e by reducing per resistant to 16 bar hy up to a width of 0.50 er-in-charge. The pro- | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine 2 leakage. For horizontal surface of | roof slabs in the rate alline slur inthetic fib bility of o static pres . The world t performation | s, podiums, tio of 5 : 2 rry : 1 part y per brush. T concrete by ssure on neg k shall be c | reservi (5 parts water) f he mat more gative s arried o | or, sewage & water the sintegral crystalline for horizontal surface erial shall meet the right than 90% compare side. The crystalline but all complete as point of the second sec | reatment plar slurry : 2 par es and applyir equirements a d with contr slurry shall b er specificatio |
| 1 8.50 | Bottom slab inside | .5 | 72.25 | m^2 | | |
| 1 8.50 | Total | 5 | 72.25 | | | |
| 72.25 m ² | Say | + + | | Rs | 458.77 | 33146.1 |
| | | | 0 | | | 55140.1 |
| 2 17.00 | 12 mm cement plaster finished w Inside of walls | 4.10 | 139.40 | | e sand) | |
| 1 8.50 | Base slab inside | .5 | 72.25 | | | |
| 2 22.00 | Outside wall | 4.4 | 193.60 | | | |
| 4 11.45 | Walk way | 1 | 45.80 | | | |
| | Total | - | 451.05 | m ² | | |
| 451.05 m ² | Say | | | Rs | 418.79 | 188894.0 |
| boot rest of minimum 6 ing to IS:1786, having a and width as 165 mn d on top surface by rib on tail length on 138 m resistance test as per s be visible even after f | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to | h minimu or cheque per stand fications a g including | nss section a m 112 mm s ering beside lard drawing and having s g fixing in t | s 23 mi space b s neces g and su manufa nanhole | n x 25 mm and etween ssary and uitable to with ctures es with | |
| boot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib on tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1 cement: 2 | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical | h minimu or cheque per stand fications a g including | nss section a m 112 mm s ering beside lard drawing and having s g fixing in t | s 23 mi space b s neces g and su manufa nanhole | n x 25 mm and etween ssary and uitable to with ctures es with | |
| boot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib on tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1 cement: 2 | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl | h minimu or cheque per stand fications a g including | oss section a m 112 mm s ering beside lard drawing and having g fixing in n 6 graded ste | s 23 mi space b es neces g and su manufa nanhole one agg | n x 25 mm and etween ssary and uitable to with ctures es with | |
| boot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib m tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 3 resign | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de | h minimun or cheque per stand fications a g including rse sand: | oss section a m 112 mm ering beside dard drawing and having g fixing in 1 6 graded ste 12 (@ | s 23 mi space b ss necess g and su manufa nanhole one agg No. Rs | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 | 6826.5 |
| bot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib on tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 3 sign 12 12 12 12 12 13 14 10 15 15 15 10 10 10 10 10 10 10 10 10 10 10 10 10 | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de | h minimur or cheque per stand fications a g including rse sand: | oss section a m 112 mm ering beside dard drawin and having g fixing in i 6 graded ste 12 @ er from a di ir of height | s 23 mi space b ss neces g and su manufa manhole one agg No. Rs stance onot less | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km e than 3 m using | 6826.5 |
| bot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib on tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 3 sign 12 12 12 12 12 13 14 10 15 15 15 10 10 10 10 10 10 10 10 10 10 10 10 10 | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete | h minimur or cheque per stand fications a g including rse sand: | oss section a m 112 mm ering beside dard drawin and having g fixing in i 6 graded ste 12 @ er from a di ir of height | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km e than 3 m using | 6826.5 |
| oot rest of minimum 6 ing to IS:1786, having a and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 2 sign 12 12 12 12 1 1 1 1 1 | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete | h minimun or cheque per stand fications a g including urse sand: eying wate he reservoi d other ap | oss section a m 112 mm s ering beside dard drawing and having g fixing in i 6 graded sto 12 <u>@</u> er from a di ir of height pliences and | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km e than 3 m using | 6826.5 |
| oot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 2 sign 12 12 12 12 1 1 1 1 1 1 1 1 1 1 1 1 1 389.38 | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say | h minimur or cheque per stand fications a g including urse sand: eying wate he reservoir d other ap | oss section a m 112 mm s ering beside dard drawin, and having g fixing in 1 6 graded ste 12 @ er from a di ir of height pliences an 389.376 389.376 @ | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o m3 Rs | n x 25 mm and etween sary and uitable to with ctures es with rregate 20 mm 568.88 of 5 km than 3 m using f water etc. 218.95 | 6826.5 |
| boot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 1 rest fited in lorry and c 1 10.4 1 10.4 389.38 Kill approved size by well cs, including applying | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of 3 staircase railing and similar work | h minimur or cheque per stand fications a g including irse sand: eving wate he reservoir d other app 4 3.6 e e e e e e e e e e e e e e e e e e e | oss section a m 112 mm s ering beside lard drawin, and having g fixing in 1 6 graded sta 12 @ er from a di ir of height pliences and 389.376 389.376 @ ere ladder ra | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o m3 Rs iling, ba | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km than 3 m using of water etc. 218.95 alcony railing, | |
| boot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 1 rest fited in lorry and c 1 10.4 1 10.4 389.38 Kill approved size by well cs, including applying | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of 3 staircase railing and similar work 50mm dia G.I5.17kg/m , 32mn | h minimur or cheque per stand fications a g including irse sand: eving wate he reservoir d other app 4 3.6 e e e e e e e e e e e e e e e e e e e | oss section a m 112 mm s ering beside lard drawin, and having g fixing in 1 6 graded sta 12 @ er from a di ir of height pliences and 389.376 389.376 @ ere ladder ra | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o m3 Rs iling, ba | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km than 3 m using of water etc. 218.95 alcony railing, | |
| boot rest of minimum 6 ing to IS:1786, having and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 1 rest fited in lorry and c 1 10.4 1 10.4 389.38 Kill approved size by well cs, including applying | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of 3 staircase railing and similar work | h minimur or cheque per stand fications a g including irse sand: eving wate he reservoir d other app 4 3.6 e e e e e e e e e e e e e e e e e e e | oss section a m 112 mm s ering beside lard drawin, and having g fixing in 1 6 graded sta 12 @ er from a di ir of height pliences and 389.376 389.376 @ ere ladder ra | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o m3 Rs illing, ba steel pr | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km than 3 m using of water etc. 218.95 alcony railing, | |
| oot rest of minimum 6 ing to IS:1786, having a and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as per s be visible even after f lock 1:3:6 (1cement: 2 sign 12 12 12 12 13 10.04 1 <tr td=""></tr> | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of 3 staircase railing and similar work 50mm dia G.I5.17kg/m , 32mm Outer total-45.8m/1m c/c | h minimun or cheque per stand fications a g including urse sand: eying wate he reservoi d other app etc. to ste ing coat o | oss section a m 112 mm s ering beside lard drawin, and having g fixing in 1 6 graded ste 12 @ 12 @ er from a di ir of height pliences and 389.376 @ 289.376 @ 289.376 @ 289.376 % 389.376 % 389.376 % 389.376 % 389.376 % 389.376 % 389.376 % 389.376 % 389.376 % 389.376 % 389.376 % 389.376 % % 389.376 % % \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | s 23 mi space b ss neces g and si manufa nanholo one agg No. Rs stance o not less d cost o m3 Rs iling, ba steel pr | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km than 3 m using of water etc. 218.95 alcony railing, imer. 178.37 | |
| | | | | | | |
| oot rest of minimum 6 ing to IS:1786, having a and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as persistance test as persise be visible even after f lock 1:3:6 (1cement: 1 issign 12 12 12 12 13 14 15 16 17 18 19 10 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 11.0.4 12 13.0 14.0 15.8 15.8 16.0 17.1 18.0 10.4 | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of 3 staircase railing and similar work 50mm dia G.I5.17kg/m , 32mm Outer total-45.8m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia | h minimun or cheque per stand fications a g including urse sand: eying wate he reservoi d other app etc. to ste ing coat o | oss section a m 112 mm s ering beside dard drawing and having g fixing in n 6 graded sta 12 @ er from a di ir of height pliences and 389.376 @ sel ladder ra of approves 5.17 3.17 | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o m3 Rs iling, ba steel pr | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km of 435.56 | 85252. |
| oot rest of minimum 6 ing to IS:1786, having a and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as persistance test as persise be visible even after f lock 1:3:6 (1cement: 1 issign 12 12 12 12 13 12 13 14 15 16 17 18 19 10 10.4 389.38 Kill approved size by well as, including applying n dia GI-3.17kg/m 46 3 45.8 613.92 kg | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of 3 staircase railing and similar work 50mm dia G.I5.17kg/m , 32mm Outer total-45.8m/1m c/c vertical 50mm dia | h minimur or cheque per stand fications a g including rrse sand: eying wate he reservoid d other app 4 3.6 e etc. to ste ing coat o | oss section a m 112 mm s ering beside dard drawing and having g fixing in n 6 graded sta 12 @ er from a di ir of height pliences and 389.376 @ sel ladder ra of approves 5.17 @ | s 23 mi space b ss neces g and ss manufa nanhole one agg No. Rs stance o not less d cost o m3 Rs iling, ba steel pr kg kg Rs | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km of 5 km of 435.56 194.18 | |
| oot rest of minimum 6 ing to IS:1786, having a and width as 165 mm d on top surface by rib n tail length on 138 m resistance test as persistance test as persise be visible even after f lock 1:3:6 (1cement: 1 issign 12 12 12 12 13 12 13 14 15 16 17 18 19 10 10.4 389.38 Kill approved size by well as, including applying n dia GI-3.17kg/m 46 3 45.8 613.92 kg | on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of 3 staircase railing and similar work 50mm dia G.I5.17kg/m , 32mm Outer total-45.8m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi surf | h minimur or cheque per stand fications a g including rrse sand: eying wate he reservoid d other app 4 3.6 e etc. to ste ing coat o | oss section a m 112 mm s ering beside dard drawing and having g fixing in n 6 graded sta 12 @ er from a di ir of height pliences and 389.376 @ sel ladder ra of approves 5.17 @ | s 23 mi space b ss necess g and ss manufa manhole one agg No. Rs stance o not less d cost o m3 Rs illing, b steel pr kg kg Rs g prime | n x 25 mm and etween sary and uitable to with ctures es with regate 20 mm 568.88 of 5 km of 5 km of 435.56 194.18 | 85252.0 |

| | | Say | | 6.12 | m2 | | (a) | Rs | 154.62 | 946.56 |
|---------|---------|--|----------|-------------|----------------|----------|---------------|----------------|--------------------|---------------------------------------|
| | | Finishing with Epoxy paint (two | or more | coats) at a | all location | is prepa |) | | per | |
| | | manufacturer's specifications inc | luding a | ppropriate | priming o | oat, pro | eparation of | surfac | e, etc. complete. | |
| | | On concrete work | | | | | | | | |
| 16 | 13.52.2 | | <u> </u> | 1 | I | | | | | |
| | | Base slab & inside walls | 1 | 211.65 | | | 0 | | 211.65 | |
| | | Say | | 211.65 | m2 | | a | Rs | 232.68 | 49245.73 |
| | | Total-MBBR Tank-1 | | | | | | | | 6277552.41 |
| | VING | BED BIOFILM REACTOR TA | NK- N | ITRIFIC | ATION | 1 | 1 | | | - |
| Ite | | | | | | | | | | |
| m No | Item | | | | | | | | | |
| | | Description | No | L | в | н | v | Unit | Rate | Amount |
| | | Shape of tank | 1 | | | | 2 for circula | | | |
| | | Earth work in excavation by mec | hanical | - | | | | | ver areas (exceed | ing 30 cm in depth. |
| | | 1.5 m in width as well as 10 sqm | | | | | | | | |
| 1 | 2.6.1 | 1.5 m, as directed by Engineer-in | -charge | | | | | | | |
| - | | MBBR Tank-base | 1 | 11.20 | 11.2 | 1.00 | 125.44 | m ³ | | |
| | | Total | | 11.20 | 11.2 | 1.00 | 125.44 | | | |
| | | Say | | 125.44 | m ³ | | | Rs | 223.41 | 28023.94 |
| | | Random rubble masonry in hard | stone i | | | inth inc | | | | |
| 2 | 7.1.1 | plinth level with cement mortar 1 | | | · · · F | | 0 | 0 1 | | · · · · · · · · · · · · · · · · · · · |
| 2 | 7.1.1 | MBBR Tank-base | 1 | 11.20 | 11.2 | 0.90 | 112.9 | m ³ | | |
| | | Total | 1 | 11.20 | 11.2 | 0.90 | 112.9 | | | |
| | | Say | | 112.9 | m ³ | | | Rs | 7520.41 | 940054 14 |
| | | Suy | | 112.9 | 111 | | <u>u</u> | KS | /520.41 | 849054.16 |
| | | Providing and laying in position | cement | concrete | of specifi | ed grad | le excluding | the co | ost of centering a | nd shuttering - All |
| 3 | 4.1.6 | work up to plinth level : 1:3:6 (1 | | | - | - | - | | - | - |
| | | MBBR tank-base | 1 | 11.2 | 11.2 | 0.15 | 18.82 | m ³ | | |
| | | Total | | | | | 18.82 | m ³ | | |
| | | Say | | 18.82 | m ³ | | a | Rs | 7527.06 | 141659.28 |
| | | Providing and laying in position | ready n | • | • | oncrete | for reinford | ed cer | nent concrete wo | rk, using Sulphate |
| | | Resistant Cement (SRC) cont | | | • | | | | | · • • |
| | | transported to site of work in transported to site of work in transported to site of work in transported to site of the second s | | | | - | - | | | |
| | | of specified grade for reinforced | | | | | | | | |
| | 5 27 1 | excluding the cost of centering, proportions as per IS : 9103 to a | | | | | | | | |
| | + | durability as per direction of | | | | | | | | |
| 4 | | kg/3.Excess/less cement used as p | | | | | | | | Ŭ |
| | | Base slab | 1 | 11.2 | 11.2 | 0.35 | 43.90 | m ³ | | |
| | | Total | | | | | 43.90 | | | |
| | | Say | | 43.90 | m ³ | | | Rs | 10404.79 | 456811.91 |
| | | Providing and laying in position | ready r | | | oncrete | - | | | |
| | | Resistant Cement (SRC) conten | - | | - | | | | | |
| | | transported to site of work in | | | | | | | | |
| | | of specified grade for reinforced | | | | • • | | | | |
| | 5 37 2 | excluding the cost of centering, proportions as per IS : 9103 to a | | | | | | | | |
| | + | durability as per direction of | | | | | | | | |
| 1a | 5.34.1 | kg/3.Excess/less cement used as | | | | | | | | 0.10 |
| | | Tank walls | 2 | | 0.30 | 4.10 | 49.20 | | | |
| | | Walk way | 4 | 10.75 | 0.45 | 0.1 | 1.94 | | 1 | |
| | | Total | | 10.00 | 5.15 | 5.1 | 51.14 | m ³ | | |
| | | Say | | 51.14 | m ³ | | | Rs | 12129.26 | 620229.84 |
| | | Suy | | 51.14 | | | <i>w</i> | 17.5 | 12127.20 | 020227.04 |

| | | Epoxy coated steel reinforceme | ent for h | R.C.C. wa | | | | | | ng in position and |
|----|---------|--|---|--|--|---|--|--|--|--|
| 5 | | binding all complete upto plinth l | | ormo Moc | hanically | Trantad | hare of gra | da Ea 5 | 00D or more | |
| 5 | 0 | Quantity as per item No.4&4a | 1 | ermo-mee | 144.24 | | - | kg/m ³ | 17308.80 | kσ |
| | | Total | 1 | | 177.27 | | 120 | | 17308.80 | - |
| | | Say | | 17308.8 | kg | | (a) | Rs | 104.91 | 1815853.23 |
| 6 | 4.12 | Extra for providing and mixing manufacturer's specification. | water p | | J. | cement | | | doses by weigh | |
| | | Quantity as per item No.4&4a | 1 | | 144.24 | m ³ | 340 | kg/m ³ | 49041.60 | kg |
| | | Total | | | | | | | 49041.60 | kg |
| | | Say | | 980.83 | bags | | @ | Rs | 70.77 | 69408.58 |
| 7 | 5.9.1 | Centering and shuttering includ columns, etc. for mass concrete | ling stru | tting, proj | pping etc. | and re | emoval of f | òrm fo | or :Foundations, | footings, bases of |
| | | Bottom slab | 2 | 20.60 | | 0.35 | 14.42 | m ² | | |
| | | Total | | | | | 14.42 | | | |
| | | Say | | 14.42 | m ² | | | Rs | 350.00 | 5047.05 |
| 8 | 5.9.2 | Centering and shuttering includ attached pilasters, butteresses, pl | inth and | string cou | | | | | r :Walls (any th | ickness) including |
| | | For walls outside | 2 | 20.60 | | 4.10 | 168.92 | | | |
| | - | For walls inside | 2 | 19.40 | | 4.10 | 159.1 | m | | |
| | - | Walk way | 4 | 11.45 | | 1.00 | 45.8 373.80 | m ² | | |
| | | Total Say | | 373.80 | ² | | | m Rs | 748.62 | 279835.25 |
| | | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACL 212-3R-2010 | the basen k etc., pr 3 : 1 (3 p l) side w | ment, wat repared by parts integ ith the he | er tanks, ro y mixing in ral crystall lp of synth | oof slab n the ra line slui netic fil | os, podiums, tio of 5 : 2 rry : 1 part v per brush. T | reservi (5 part water) f he mat | or, sewage & wa s integral crystall for horizontal sur erial shall meet t | ter treatment plant line slurry : 2 parts faces and applying he requirements as |
| | | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine | the bases k etc., pi 3 : 1 (3 p l) side w i.e by resistant s up to a cer-in-cha | ment, wate repared by parts integ ith the he reducing to 16 ba width of arge. The | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slab in the rational time slum netic filt ity of tic press The wor | os, podiums, tio of 5 : 2 rry : 1 part v per brush. T concrete by ssure on neg k shall be c | reservi (5 part water) the mat more gative s arried of | for, sewage & was s integral crystall for horizontal sur erial shall meet t than 90% comp side. The crystall out all complete a | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification |
| 9 | 22.23.1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two | the based k etc., pr 3 : 1 (3 p l) side w i.e by resistant s up to a coats @ | ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The 0.70 kg p | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slab in the ra line slum etic fil ity of tic pres 'he wor perform | os, podiums, tio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg ck shall be c hance shall | reservit (5 part water) t he mat more gative s arried of carry g | for, sewage & was s integral crystall for horizontal sur erial shall meet t than 90% comp side. The crystall out all complete a | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification |
| 9 | 22.23.1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two Inside of walls | the bases k etc., pi 3 : 1 (3 p l) side w i.e by resistant s up to a cer-in-cha | ment, wate repared by parts integ ith the he reducing to 16 ba width of arge. The | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slab in the rational time slum netic filt ity of tic press The wor | os, podiums, tio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg k shall be c hance shall 159.08 | reservit (5 part water) the mat or more gative s arried of carry g m ² | for, sewage & was s integral crystall for horizontal sur erial shall meet t than 90% comp side. The crystall out all complete a | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification |
| 9 | 22.23.1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two | the based k etc., pr 3 : 1 (3 p l) side w i.e by resistant s up to a coats @ | ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The 0.70 kg p | er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm | bof slab in the ra line slum etic fil ity of tic pres 'he wor perform | os, podiums, ttio of 5 : 2 rry : 1 part v per brush. T concrete by ssure on neg k shall be c ance shall 159.08 159.08 | reservit (5 part water) the mat or more gative s arried of carry g m ² | for, sewage & was s integral crystall for horizontal sur erial shall meet t than 90% comp side. The crystall out all complete a | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification |
| 9 | 22.23.1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and | the base k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a coats @ 2 1 crystal the base k etc., p 3 : 1 (3 p l) side w i.e by resistant | ment, wat repared by parts integ ith the he reducing to 16 ba width of 0 arge. The 0.70 kg p 19.40 159.08 Illine slurr ment, wat repared by parts integ ith the he reducing to 16 ba | er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p product p eer sqm m ² y of hydr er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta | of slab a the ra line sluu hetic fili ity of tic pres 'he wor berform 4.10 ophilic bof slab a the ra line sluu hetic fili ity of tic pres | os, podiums, ttio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg k shall be c ance shall of 159.08 159.08 (<i>i</i>) in nature vs, podiums, tio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg | reservit (5 part water) \pm he mat y more gative s arried of carry g m^2 m^2 m^2 Rs for wa reservit (5 part water) \pm he mat y more gative s | tor, sewage & was integral crystall for horizontal sur erial shall meet t than 90% compside. The crystall complete a guarantee for 10 595.28 terproofing treat for horizontal sur erial shall meet t than 90% compside. The crystall for horizontal sur erial shall meet t than 90% compside. The crystall for horizontal sur erial shall meet t than 90% compside. The crystall sure statement of the crystall for horizontal sure erial shall meet t than 90% compside. The crystall sure statement of the crystalle sure statement of the crystatement of the crystatement | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be us per specification years against any 94696.38 ment to the RCC ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be |
| | 22.23.1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 | the based k etc., pi 3 : 1 (3 p l) side w i.e by resistant s up to a coats @ 2 11 crystal the based k etc., pi 3 : 1 (3 p l) side w i.e by resistant s up to a ser-in-cha | ment, wat repared by parts integ ith the he reducing to 16 ba width of 0 arge. The 0.70 kg p 19.40 159.08 Illine slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of 0 arge. The | er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p eer sqm m ² y of hydr er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p | of slab a the rational slup hetic filt ity of tic press The wor berform 4.10 0 ophilic bof slab a the rational slup hetic filt ity of tic press The wor | os, podiums, ttio of 5 : 2 rry : 1 part v per brush. T concrete by ssure on neg k shall be c ance shall of 159.08 159.08 (<i>a</i>) in nature os, podiums, ttio of 5 : 2 rry : 1 part v per brush. T concrete by ssure on neg k shall be c | reservit (5 part water) \pm he mat y more gative s arried of carry g m^2 m^2 m^2 Rs for wa reservit (5 part water) \pm he mat y more gative s arried of carry g | tor, sewage & was integral crystall for horizontal sur erial shall meet t than 90% compside. The crystall bout all complete a guarantee for 10 595.28 terproofing treat for horizontal sur erial shall meet t than 90% compside. The crystall for horizontal sure erial shall meet t than 90% compside. The crystall bout all complete a source of the crystall for horizontal sure erial shall meet t than 90% compside. The crystall bout all complete a source of the crystalle bout all complete a source of t | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with controo line slurry shall be as per specification years against any 94696.38 ment to the RCC ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification |
| | | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine | the based k etc., pi 3 : 1 (3 p l) side w i.e by resistant s up to a coats @ 2 11 crystal the based k etc., pi 3 : 1 (3 p l) side w i.e by resistant s up to a ser-in-cha | ment, wat repared by parts integ ith the he reducing to 16 ba width of 0 arge. The 0.70 kg p 19.40 159.08 Illine slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of 0 arge. The | er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p er sqm m ² y of hydr er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. | of slab a the rational slup hetic filt ity of tic press The wor berform 4.10 0 ophilic bof slab a the rational slup hetic filt ity of tic press The wor | os, podiums, ttio of 5 : 2 rry : 1 part v per brush. T concrete by ssure on neg k shall be c ance shall 159.08 (0) in nature os, podiums, ttio of 5 : 2 rry : 1 part v per brush. T concrete by ssure on neg k shall be c ance shall | reservi (5 part water) the mate of more gative searried carry generation m ² m ² m ² Rs for water (5 part water) the mate of more gative searried carry generation (5 part water) the mate of more gative searried carry generation (5 part water) the mate of more gative searried carry generation (5 part) the mate of more searried of the mate of | tor, sewage & was integral crystall for horizontal sur erial shall meet t than 90% compside. The crystall bout all complete a guarantee for 10 595.28 terproofing treat for horizontal sur erial shall meet t than 90% compside. The crystall for horizontal sure erial shall meet t than 90% compside. The crystall bout all complete a source of the crystall for horizontal sure erial shall meet t than 90% compside. The crystall bout all complete a source of the crystalle bout all complete a source of t | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with controo line slurry shall be as per specification years against any 94696.38 ment to the RCC ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification |
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| 10 | 22.23.2 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface of Bottom slab inside Total Say 12 mm cement plaster finished w | the base k etc., p 3 : 1 (3 p l) side w i.e by resistant coats @ 2 2 1 crystal the base k etc., p 3 : 1 (3 p l) side w i.e by resistant k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a ser-in-cha | ment, wat repared by parts integ ith the he reducing to 16 ba width of 0 arge. The 0.70 kg p 19.40 159.08 Illine slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of 0 arge. The 21.10 kg p 9.70 94.09 ating coat | er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p eer sqm m ² y of hydr er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 9.7 m ² of neat cer | oof slab a the ra line sluu etic fili ity of tic press 'he wor berform 4.10 ophilic bof slab a the ra line sluu hetic fili ity of tic press 'he wor berform ent: 1 | ps, podiums, tito of $5 : 2$ rry : 1 part v per brush. T concrete by ssure on neg k shall be c ance shall $\frac{159.08}{0}$ in nature ps, podiums, tio of $5 : 2$ rry : 1 part v per brush. T concrete by ssure on neg k shall be c ance shall $\frac{94.09}{0}$ 94.09 $\frac{3}{2}$ (1 cement 159.08 94.09 | reservit (5 part water) \pm he mat y more gative s arried of carry g m ² m ² Rs for wa reservit (5 part water) \pm he mat y more gative s arried of carry g m ² (5 part water) \pm he mat y more gative s arried of carry g m ² m ² Rs m ² m ² (5 part water) \pm he mat y more gative s arried of carry g m ² m ² (5 part water) \pm he mat y more gative s arried of carry g m ² m ² m ² Rs m ² m ² m ² t = 3 fin m ² m ² m ² m ² m ² m ² m ² m ² | tor, sewage & was integral crystall for horizontal sur- erial shall meet than 90% complete a guarantee for 10 595.28 terproofing treat for, sewage & was integral crystall for horizontal sur- erial shall meet than 90% complete a guarantee for 10 595.28 terproofing treat for horizontal sur- erial shall meet than 90% complete a guarantee for 10 458.77 | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with control line slurry shall be us per specification years against any 94696.38 ment to the RCC ter treatment plant ine slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification years against any |
| 10 | 22.23.2 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface of Bottom slab inside Total Say 12 mm cement plaster finished w Inside of walls | the base k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a per-in-cha coats @ 2 2 1 1 crystal the base k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a ser-in-cha coats @ 2 1 1 crystal the base k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a ser-in-cha coats @ 2 1 crystal the base k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a ser-in-cha coats @ 2 1 crystal the base k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a ser-in-cha coats @ 2 1 crystal the base k etc., p 1 crystal the base k etc., p 1 crystal the base k etc., p 1 crystal the base k etc., p 1 crystal the base the base the base the base the base the base the base the base the base the base the base the base the base the base the base the | ment, water repared by parts integ ith the he reducing to 16 ba width of (arge. The 0.70 kg p 19.40 159.08 Illine slurr ment, water repared by parts integ ith the he reducing to 16 ba width of (arge. The @1.10 kg 9.70 94.09 ating coat 19.40 | er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p rer sqm m ² y of hydr er tanks, ro y mixing in ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p per sqm. 9.7 m ² of neat cer | oof slab a the ra line sluu etic fili ity of tic press 'he wor berform 4.10 ophilic bof slab a the ra line sluu hetic fili ity of tic press 'he wor berform ent: 1 | os, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg k shall be c ance shall <u>159.08</u> <u>@</u> in nature os, podiums, tito of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg k shall be c ance shall <u>94.09</u> <u>94.09</u> <u>@</u> :3 (1 cement 159.08 | reservit (5 part water) \pm he mat y more gative s arried of carry g m ² m ² Rs for wa reservit (5 part water) \pm he mat y more gative s arried of carry g m ² (5 part water) \pm he mat y more gative s arried of carry g m ² m ² Rs m ² m ² (5 part water) \pm he mat y more gative s arried of carry g m ² m ² (5 part water) \pm he mat y more gative s arried of carry g m ² m ² m ² Rs m ² m ² m ² t = 3 fin m ² m ² m ² m ² m ² m ² m ² m ² | tor, sewage & was integral crystall for horizontal sur- erial shall meet than 90% complete a guarantee for 10 595.28 terproofing treat for, sewage & was integral crystall for horizontal sur- erial shall meet than 90% complete a guarantee for 10 595.28 terproofing treat for horizontal sur- erial shall meet than 90% complete a guarantee for 10 458.77 | ter treatment plant line slurry : 2 parts faces and applying he requirements as pared with control line slurry shall be us per specification years against any 94696.38 ment to the RCC ter treatment plant ine slurry : 2 parts faces and applying he requirements as pared with contro line slurry shall be as per specification years against any |

| | | Say | | 253.17 | m ² | | a | Rs | 418.79 | 106024.37 |
|----|---------|--|-----------|------------|----------------|-----------------------|---------------|----------------|--------------------|--------------------|
| | | Providing orange colour safety for | | | | | | | | |
| | | on 12 mm dia steeel bar conform | | | | | | | | |
| | | over all minimum length 263 mm | | | | | | | | |
| | | protruded legs having 2 mm tread adequate anchoring projections o | | | | | | | | |
| 12 | 19.16 | stand the bend test and chemical | | | | | | | | |
| | | permanent identification mark to | | - | - | | • | | | |
| | | 30x20x15 cm cement concrete bl | | | | | | | | |
| | | nominal size) Complete as per de | sign | | | | | | | |
| | | | 12 | | | | 12 | No. | | |
| | | Sou | 12 | 13 | No. | | | Rs | 568.88 | 6826.56 |
| | | Say Filling water with 5000 litre tank | are fitad | | | ing wat |) | | | 0820.50 |
| | | (average) to the reservoir site and | | | | | | | | |
| | | 5 HP diesel engine pump set , hir | | | | | | | | |
| 13 | 100.36 | complete. | | , | | 1 | 1 | | | |
| 15 | 100.50 | | 1 | 9.7 | 9.7 | 3.6 | 338.724 | m3 | | |
| | | 4-4-1 | 1 | 9.1 | 9.1 | 5.0 | 338.724 | ms | | |
| | | total | | | | | | | | |
| | | Say | | | Kilo litre | |) | Rs | 218.95 | 74162.57 |
| 14 | 10.26.3 | Providing and fixing hand rail of | | - | - | c. to ste | eel ladder ra | uing, b | alcony railing, | |
| | | 50mm dia G.I5.17kg/m, 32mm | n dia GI- | ·3.17kg/m | | | | | | |
| | | Outer total-45.8m/1m c/c | | | | | | | | |
| | | vertical 50mm dia | 46 | | | 0.75 | 5.17 | kg | 178.37 | |
| | | Horizontal 0.25m c/c-32mm dia | 3 | 45.8 | | | 3.17 | kα | 435.56 | |
| | | | 5 | | 1 | | | | | 110011.05 |
| | | Say Einishing with Dalwas Multi auf | | 613.92 | 0 | |) | Rs | 194.18 | 119211.05 |
| | | Finishing with Deluxe Multi surfamentations: | ace pain | t system f | or interiors | s and ex | teriors using | g prime | er as per | |
| 15 | 13.48.3 | manufacturers specifications. | | | | | | | | |
| | | vertical pipe | 46 | 0.75 | | 0.05 | 1.725 | m2 | | |
| | | Horizontal pipe | 3 | 45.8 | | 0.03 | 4.40 | m2 | | |
| | | Say | | 6.12 | m2 | | (a) | Rs | 154.62 | 946.56 |
| | | Finishing with Epoxy paint (two | or more | | | s prepa | ý | | per | |
| | | manufacturer's specifications incl | luding a | ppropriate | priming c | oat, pre | eparation of | surface | e, etc. complete. | |
| 16 | 13.52.2 | On concrete work | | | | | | 1 | | |
| | | Base slab & inside walls | 1 | 253.17 | | | 1 | | 253.17 | |
| | | Say | | 253.17 | m2 | | a | Rs | 232.68 | 58906.41 |
| | | Total-MBBR Tank-2 | | | | | | | | 4769862.76 |
| мо | VING | BED BIOFILM REACTOR TA | NK- D | ENITRIF | ICATION | N | | | | |
| m | Code | Description | No | L | В | Н | V | Unit | Rate | Amount |
| | | Shape of tank | 1 | (put 1 for | rectangula | ar and 2 | 2 for circula | r) | | |
| | | Earth work in excavation by mee | hanical | means (Hy | draulic ex | cavato | r)/manual m | eans ov | ver areas (exceedi | ng 30 cm in depth, |
| | | 1.5 m in width as well as 10 sqm | on plan | | | | | | | |
| 1 | 2.6.1 | 1.5 m, as directed by Engineer-in | -charge | | | | | | | |
| | | MBBR Tank-base | 1 | 7.70 | 7.7 | 0.90 | 53.36 | m ³ | | |
| | | Total | | | | | 53.36 | | | |
| | | Say | | 53.36 | m ³ | | | Rs | 223.41 | 11920.90 |
| | | Random rubble masonry in hard | stone i | | | inth inc |) | | | |
| 2 | 7.1.1 | plinth level with cement mortar 1 | | | | | | -0 ~P | | «p to |
| | | MBBR Tank-base | 1 | 7.70 | 7.7 | 0.60 | 35.57 | m ³ | | |
| | | Total | | | · · · · · | | 35.57 | | | |
| | | Say | | 35.57 | m ³ | | | Rs | 7520.41 | 267500.94 |
| 3 | 4.1.6 | work up to plinth level : 1:3:6 (1 | Cement | | | e-III) [,] 6 | | | - | _ |
| - | | MBBR tank-base | 1 | 7.7 | 7.7 | | 8.89 | | | |
| | | Total | - | ,., | ,., | 0.10 | 8.89 | | | |
| | | | | | | | 0.09 | | | |

| | | Say | | 8.89 | m ³ | | a | Rs | 7527.06 | 669 | 15.57 |
|--------------------------|---------------|--|--|--|--|---|--|--|--|--|--|
| | | Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tra | ent as p | per approv | ved design | n mix, | manufactur | ed in f | fully automatic b | patching plan | t and |
| 5 | 5.37.1 | of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a | , shutter | ing finish | ing and re | einforce | ement, inclu | ding c | ost of admixture | s in recomme | ended |
| + | + | durability as per direction of | | | | | | | | | |
| 4 5 | 5.34.1 | kg/3.Excess/less cement used as p | per desig | gn mix is p | ayable/rec | overab | le separately | <i>י</i>). | | - | |
| | | Base slab | 1 | 7.7 | 7.7 | 0.35 | 20.75 | | | | |
| | | Inverted beam | 4 | 7.00 | 0.30 | 0.55 | 4.62 | | | | |
| | | Total | | | | | 25.37 | m ³ | | | |
| | | Say | | 25.37 | m ³ | | a | Rs | 10404.79 | 26398 | 85.14 |
| 4a | | Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tra of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p | ent as p nsit mix cement , shutter accelerat the Eng | ber approver for all l concrete v ing finish ce/ retard s gineer-in-c | ved design eads, havin work, inclu- ing and re- setting of o harge. (N | n mix, ng cont uding p einforce concrete ote :- | manufactur inuous agita umping of F ement, inclu e, improve v Cement co | ed in f ted mix R.M.C. ding co workab ntent c | fully automatic b ker, manufactured from transit mixe ost of admixture ility without imp | batching plan d as per mix d er to site of lag s in recomme airing strengt | t and esign ying , ended h and |
| | | Tank walls | 2 | 13.30 | 0.30 | 4.10 | 32.72 | m ³ | | | |
| | | Top slab | 1 | 7.00 | 7.00 | 0.15 | 7.35 | | | | |
| | | Column | 1 | 0.35 | 0.35 | 4.10 | 0.50 | | | | |
| | | Walkway | 4 | 7.25 | 0.45 | 0.10 | 1.31 | | | | |
| | | Total | | | | | 41.88 | m3 | | | |
| | | Say | | 41.8753 | m3 | | (<i>a</i>) | Rs | 12129.26 | 50791 | 15.90 |
| | 5.22.6 | | | | | | | | | | |
| + 5 6 | | Epoxy coated steel reinforceme binding all complete upto plinth | | | | | | | | ng in positior | n and |
| | | | | | | Treated | bars of gra | | | | n and |
| | | binding all complete upto plinth | | | chanically | Treated | bars of gra | de Fe-5 | 00D or more. | kg | n and |
| | | binding all complete upto plinth Quantity as per item No.4&4a | | | chanically 67.25 | Treated | bars of gra 120 | de Fe-5 | 500D or more. 8069.61 | kg | |
| 5 6 | | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. | level. Th 1 | ermo-Mec 8069.61 | chanically 67.25 kg naterial in | Treated m ³ cemen | bars of gra 120 @ t concrete w | de Fe-5 kg/m ³ Rs vork in | 00D or more. 8069.61 8069.61 104.91 doses by weigh | kg kg 8465' t of cement a | 76.73 |
| 56 | 5 | binding all complete upto plinth Quantity as per item No.4&4a Total Say Extra for providing and mixing | level. Th 1 | ermo-Mec 8069.61 | chanically 67.25 kg | Treated m ³ cemen | bars of gra 120 @ t concrete w | de Fe-5 kg/m ³ Rs | 00D or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 | kg kg 8465' t of cement a | 76.73 |
| 56 | 5 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. | level. Th | ermo-Mec 8069.61 proofing n | hanically 67.25 kg haterial in 67.25 | Treated m ³ cemen | bars of gra 120 @ t concrete v 340 | de Fe-5 kg/m ³ Rs vork in kg/m ³ | 00D or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 | kg kg 8465' t of cement a | 76.73 |
| 56 | 5 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 | level. Th | ermo-Mec 8069.61 | hanically 67.25 kg haterial in 67.25 | Treated m ³ cemen | bars of gra 120 @ t concrete v 340 | de Fe-5 kg/m ³ Rs vork in | 00D or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 | kg kg 8465' t of cement a kg kg | 76.73 |
| 5 6 | 5 | binding all complete upto plinth l Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete | level. Th | 8069.61 9roofing n 457.28 tting, pro | hanically 67.25 kg haterial in 67.25 bags | reated m ³ cemen m ³ and re | l bars of gra 120 @ t concrete v 340 @ emoval of f | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs | 00D or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 | kg kg t of cement a kg kg 3235 | 76.73 s per |
| 5 6 6 4 | 4.12 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab | water p | ermo-Mec 8069.61 proofing n 457.28 | hanically 67.25 kg haterial in 67.25 bags | reated m ³ cemen m ³ | l bars of gra 120 @ t concrete v 340 @ emoval of f 9.52 | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo | 00D or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 | kg kg t of cement a kg kg 3235 | 76.73 s per |
| 5 6 6 4 | 4.12 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total | level. Th | ermo-Mec 8069.61 proofing n 457.28 tting, pro | hanically 67.25 kg naterial in 67.25 bags pping etc. | reated m ³ cemen m ³ and re | bars of gra 120 @ t concrete v 340 @ emoval of f 9.52 9.52 | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo m ² m ² | 00D or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, | kg kg t of cement a kg kg 3235 | 76.73 s per |
| 5 6 6 4 | 4.12 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab | level. Th | 8069.61 9roofing n 457.28 tting, pro | hanically 67.25 kg naterial in 67.25 bags pping etc. | reated m ³ cemen m ³ and re | bars of gra 120 @ t concrete v 340 @ emoval of f 9.52 9.52 | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo | 00D or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 | kg kg t of cement a kg kg 3235 footings, bas | 76.73 s per |
| 5 6 4 6 4 7 5 | 4.12 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total | level. Th | 8069.61 8069.61 proofing n 457.28 tting, pro 13.60 9.52 tting, pro | hanically 67.25 kg haterial in 67.25 bags pping etc. m ² pping etc. | rreated m ³ cement m ³ and re 0.35 | l bars of gra 120 (a) t concrete v 340 (a) emoval of f 9.52 (a) emoval of f | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo m ² Rs form fo | 350.00 or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, 350.00 | kg kg kg kg footings, bas 333 | 76.73 s per 59.27 es of 32.04 |
| 5 6 6 4 7 5 7 | 4.12 5.9.1 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ | level. Th | 8069.61 8069.61 proofing n 457.28 tting, pro 13.60 9.52 tting, pro | hanically 67.25 kg haterial in 67.25 bags pping etc. m ² pping etc. | rreated m ³ cement m ³ and re 0.35 | 1 bars of gra 120 @ t concrete v 340 @ emoval of f 9.52 @ emoval of f 111.52 | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² Rs | 350.00 or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, 350.00 | kg kg kg kg footings, bas 333 | 76.73 s per 59.27 es of |
| 5 6 6 4 7 5 7 | 4.12 5.9.1 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ attached pilasters, butteresses, pl | level. Th | ermo-Mec 8069.61 proofing n 457.28 tting, pro 13.60 9.52 tting, pro string cou | hanically 67.25 kg haterial in 67.25 bags pping etc. m ² pping etc. rrses etc. | rreated m ³ cement m ³ and ro 0.35 and ro | l bars of gra 120 (a) t concrete v 340 (a) emoval of f 9.52 (a) emoval of f | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² Rs | 350.00 or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, 350.00 | kg kg kg kg footings, bas 333 | 76.73 s per 59.27 es of |
| 5 6 6 4 7 5 7 | 4.12 5.9.1 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside | level. Th | ermo-Mec 8069.61 proofing n 457.28 tting, pro 13.60 9.52 tting, pro string cou 13.60 | hanically 67.25 kg haterial in 67.25 bags pping etc. m ² pping etc. rrses etc. | reated m ³ cemen m ³ and ro 0.35 and ro 4.10 | 1 bars of gra 120 @ t concrete v 340 @ emoval of f 9.52 @ emoval of f 111.52 | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs corm fo m ² Rs corm fo m ² m ² m ² | 350.00 or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, 350.00 | kg kg kg kg footings, bas 333 | 76.73 s per 59.27 es of |
| 5 6 6 4 7 5 7 | 4.12 5.9.1 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside | level. Th | ermo-Mec 8069.61 proofing n 457.28 tting, pro 13.60 13.60 12.40 | hanically 67.25 kg haterial in 67.25 bags pping etc. m ² pping etc. | reated m ³ cemen m ³ and ro 0.35 and ro 4.10 | l bars of gra 120 (a) t concrete v 340 (a) emoval of f 9.52 9.52 (a) emoval of f 111.52 101.7 | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo m ² Rs form fo m ² m ² m ² m ² m ² m ² m ² m ² | 350.00 or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, 350.00 | kg kg kg kg footings, bas 333 | 76.73 s per 59.27 es of |
| 5 6 6 4 7 5 7 5 | 4.12 5.9.1 | binding all complete upto plinth l Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside top slab | level. Th | ermo-Mec 8069.61 proofing n 457.28 tting, pro 13.60 9.52 tting, pro string cou 13.60 12.40 6.20 | hanically 67.25 kg haterial in 67.25 bags pping etc. m ² pping etc. rses etc. 6.2 | reated m ³ cemen m ³ and ro 0.35 and ro 4.10 | l bars of gra 120 (a) (c) (c) (c) (c) (c) (c) (c) (c | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo m ² m ² Rs form fo m ² m ² m ² | 350.00 or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, 350.00 | kg kg kg kg footings, bas 333 | 76.73 s per 59.27 es of |
| 5 6 6 4 7 5 | 4.12 | binding all complete upto plinth I Quantity as per item No.4&4a Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.2 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ attached pilasters, butteresses, pl For walls outside For walls inside top slab Beam | level. The second secon | ermo-Mec 8069.61 proofing n 457.28 tting, pro 13.60 9.52 tting, pro string cou 13.60 12.40 6.20 6.20 | hanically 67.25 kg haterial in 67.25 bags pping etc. m ² pping etc. rrses etc. 6.2 1.1 | reated m ³ cemen m ³ and ro 0.35 and ro 4.10 | l bars of gra 120 (@) t concrete v 340 (@) emoval of f 9.52 (@) emoval of f 111.52 101.7 38.4 13.64 | de Fe-5 kg/m ³ Rs vork in kg/m ³ Rs form fo m ² m ² Rs form fo m ² m ² m ² m ² | 350.00 or more. 8069.61 8069.61 104.91 doses by weigh 22863.90 22863.90 70.77 or :Foundations, 350.00 | kg kg kg kg footings, bas 333 | 76.73 s per 59.27 es of |

| | terproofing treat | for wa | in nature | ophilic | y of hydi | line slurr | l crysta | Providing and applying integra | 1 | |
|----------------|---|--|---|---|--|---|--|--|---------|----|
| | | | | | | | | structures like retaining walls of | | |
| | | | | | | | | tunnels / subway and bridge dec | | |
| | | | | | - | - | | water) for vertical surfaces and a | | |
| | | | | | | | | the same from negative (internal specified in ACI 212-3R-2010 | | |
| | | | | | | | | concrete as per DIN 1048 and | | |
| | | | | | | | | capable of self-healing of cracks | | |
| - | - | | | | | | - | and the direction of the engine | | |
| | | | | | er sqm | 0.70 kg p | coats @ | l leakage. For vertical surface two | 22.23.1 | 9 |
| | | | 101.68 | 4.10 | | 12.40 | 2 | Inside of walls | | |
| | | m ² | 101.68 | | | | | Total | | |
| 60527.5 | 595.28 | Rs | @ | | m ² | 101.68 | | Say | | |
| | | c | . , | 1 .1. | | | 1 / | | | |
| | | | | - | | | - | Providing and applying integra structures like retaining walls of | | |
| | | | | | | | | tunnels / subway and bridge dec | | |
| | | | | | | | | water) for vertical surfaces and 3 | | |
| | | | | | | | | the same from negative (internal | | |
| | - | | - | - | - | - | - | specified in ACI 212-3R-2010 | | |
| | | | | | | | | concrete as per DIN 1048 and | | |
| | | | | | | | | capable of self-healing of cracks | | |
| ars against ar | guarantee for 10 | carry g | lance shall | beriorn | | - | | and the direction of the engine 2 leakage. For horizontal surface o | 22.23.2 | 10 |
| | | m^2 | 38.44 | | 6.2 | 6.20 | 1 | Bottom slab inside | 22.23.2 | 10 |
| | | | 38.44 | | 0.2 | 0.20 | 1 | Total | | |
| 15(25.1 | 450 55 | | | | ² | 38.44 | | | | |
| 17635.1 | 458.77 | Rs | 0 | | | | | Say | | |
| | e sand) | | | 1 | of neat ce | - | 1 1 | - | 13.7.1 | 11 |
| | | | 109.12 | 4.40 | | 12.40 | 2 | Inside of walls | | |
| | | | 38.44 | | 6.2 | 6.20 | 1 | Base slab inside | | |
| | | | 51.12 | | 7.15 | 7.15 | 1 | Cover slab top | | |
| | | m^2 | 38.44 | | 6.2 | 6.20 | 1 | Cover slab bottom | | |
| | | | 17.36 | 1.4 | | 6.20 | 2 | Beam | | |
| | | | 111.52 | 4.1 | | 6.80 | 4 | Outside wall | | |
| | | | 29 | 1 | | 7.25 | 4 | Walkway | | |
| | | | | | | | | Total | | |
| | | m ² | 395.0025 | | | 395.003 | | | 1 | |
| 165422.0 | 418.79 | m ² Rs | 395.0025 @ | | m^2 | | 1 | Say | | |
| 165422.0 | | Rs | <i>a</i> | ick pla | | | ot rest c | Say Providing orange colour safety for | | |
| 165422.0 | s per IS: 10910 | Rs lated as | @ stic encapsu | | n 6 mm th | f minimu | | Say Providing orange colour safety fo on 12 mm dia steeel bar conform | | |
| 165422.0 | s per IS: 10910 m x 25 mm and etween | Rs lated as s 23 m space b | (a) stic encapsu coss section a um 112 mm s | num ero minimu | n 6 mm th ving minin mm with | f minimu :1786, ha [,] lth as 165 | ing to IS and wic | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm | | |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and | Rs lated as s 23 m space b es neces | (a) stic encapsul coss section a um 112 mm s uering beside | num cro minimu r chequ | m 6 mm th ving minin mm with v ribbing o | f minimu :1786, ha [,] lth as 165 surface by | ing to IS and wic d on top | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread | | |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with | Rs lated as s 23 m space b es neces g and s | (a) stic encapsu oss section a um 112 mm s uering beside dard drawing | num cro minimu r chequ er stano | m 6 mm th ving minin mm with v ribbing o 8 mm as p | f minimu :1786, hav lth as 165 surface by ngth on 13 | ing to IS and wic d on top n tail ler | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of | 19.16 | 12 |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures | Rs lated as s 23 m space b es neces g and s manufa | @ stic encapsu oss section a um 112 mm s uering beside dard drawing and having i | num cro minimu r chequ er stand cations | m 6 mm th ving minin mm with v ribbing o 8 mm as p per specific | f minimu :1786, hav lth as 165 surface by ngth on 13 ce test as p | ing to IS and wic d on top n tail ler resistanc | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical | 19.16 | 12 |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with | Rs lated as s 23 m space b es neces g and s manufa manufa | @ stic encapsu oss section a um 112 mm s tering beside dard drawing and having in ng fixing in r | num cro minimu r chequ er stand cations ncludir | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i | f minimu :1786, hav th as 165 surface by ngth on 13 the test as p le even af | ing to IS and wic d on top n tail ler resistance be visib | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to | 19.16 | 12 |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with | Rs lated as s 23 m space b es neces g and s manufa manufa | @ stic encapsu oss section a um 112 mm s tering beside dard drawing and having in ng fixing in r | num cro minimu r chequ er stand cations ncludir | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i | f minimu :1786, hav th as 165 surface by ngth on 13 the test as p le even af | ing to IS and wic d on top n tail ler resistanc be visib ock 1:3: | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl | 19.16 | 12 |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with | Rs lated as s 23 m space b es neces g and s manufa manufa | @ stic encapsu oss section a um 112 mm s tering beside dard drawing and having in ng fixing in r | num cro minimu r chequ er stand cations ncludir | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i | f minimu :1786, hav th as 165 surface by ngth on 13 the test as p le even af | ing to IS and wic d on top n tail ler resistanc be visib ock 1:3: | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to | 19.16 | 12 |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with | Rs lated as s 23 m space b es neces g and s manufa manhol one agg | @ stic encapsu oss section a um 112 mm s ering beside dard drawing and having i ng fixing in r 6 graded sto | num cro minimu r chequ er stand cations ncludir | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i | f minimu :1786, hav th as 165 surface by ngth on 13 the test as p le even af | ing to IS and wid d on top n tail ler resistand be visib ock 1:3: esign | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl | 19.16 | 12 |
| 165422.0 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ictures es with gregate 20 mm | Rs lated as s 23 m space b es neces g and s manufa manhol one agg | (<i>i</i>) stic encapsu poss section a um 112 mm s learing beside dard drawing and having r ang fixing in r 6 graded sto | num cro minimu r chequ er stand cations ncludir | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i nt: 3 coars | f minimuu :1786, hav lth as 165 surface by ngth on 13 se test as p le even aff 6 (1ceme | ing to IS and wic d on top n tail ler resistanc be visib ock 1:3: | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de | 19.16 | 12 |
| 6826.5 | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with gregate 20 mm 568.88 | Rs lated as s 23 m space b es neces g and s manufa manhol one agg No. Rs | (<i>a</i>) stic encapsu oss section a um 112 mm s lering beside dard drawing and having i ng fixing in r 6 graded sto 12 (<i>a</i>) | num cro minimu r chequ er stano cations ncludir e sand: | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i nt: 3 coars | f minimuu :1786, hav 1th as 165 surface by ngth on 13 see test as p le even aff 6 (1ceme | ing to IS a and wice d on top n tail ler resistance be visib oock 1:3: sign | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de | 19.16 | 12 |
| | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with gregate 20 mm 568.88 of 5 km | Rs lated as s 23 m space b es neces g and s manufa manhol one agg No. Rs | (<i>i</i>) stic encapsu oss section a um 112 mm s lering beside dard drawing and having i ng fixing in r 6 graded sto 12 (<i>i</i>) <i>i</i> <i>i</i> <i>i</i> <i>i</i> <i>i</i> <i>i</i> <i>i</i> <i>i</i> <i>i</i> <i>i</i> | num cro minimu r chequ er stand cations ncludir e sand: | n 6 mm th ving minin mm with 7 ribbing o 8 mm as p ber specific ter fixing i nt: 3 coars No. | f minimuu :1786, hav 1th as 165 surface by ogth on 13 se test as p le even aff 6 (1ceme 12 12 in lorry as | ing to IS a and wicd d on top n tail ler resistance be visib oock 1:3: esign 12 ers fited | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank | 19.16 | 12 |
| | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with gregate 20 mm 568.88 of 5 km s than 3 m using | Rs lated as s 23 m space b es neces g and s manufa manhol one agg No. Rs stance not less | (<i>a</i>) stic encapsu pss section a um 112 mm s learing beside dard drawing and having i ng fixing in r 6 graded sto 12 (<i>a</i>) er from a dis pir of height | num cro minimu r chequ er stand cations ncludir e sand: | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i nt: 3 coars No. No. nd convey er into the | f minimuu :1786, hav 1th as 165 surface by 1gth on 13 se test as p le even aff 6 (1ceme 12 in lorry as 1g the wate | ing to IS a and wic d on top n tail ler resistance be visib oock 1:3: sign 12 ers fited l pumpir | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and | 19.16 | 12 |
| | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with gregate 20 mm 568.88 of 5 km s than 3 m using | Rs lated as s 23 m space b es neces g and s manufa manhol one agg No. Rs stance not less | (<i>a</i>) stic encapsu pss section a um 112 mm s learing beside dard drawing and having i ng fixing in r 6 graded sto 12 (<i>a</i>) er from a dis pir of height | num cro minimu r chequ er stand cations ncludir e sand: | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i nt: 3 coars No. No. nd convey er into the | f minimuu :1786, hav 1th as 165 surface by 1gth on 13 se test as p le even aff 6 (1ceme 12 in lorry as 1g the wate | ing to IS a and wic d on top n tail ler resistance be visib oock 1:3: sign 12 ers fited l pumpir | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bin nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hin | | |
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| | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with gregate 20 mm 568.88 of 5 km s than 3 m using | Rs lated as s 23 m space b es neces g and s manufa nanhol one agg No. Rs stance of d cost of | (<i>i</i>) stic encapsu poss section a um 112 mm s learing beside dard drawing and having r og fixing in r 6 graded sto 12 (<i>i</i>) er from a dis bir of height opliences and 138.384 | num cro minimu r chequ er stand cations ncludir e sand: | n 6 mm th ving minin mm with v ribbing o 8 mm as p ber specific ter fixing i nt: 3 coars No. No. nd convey er into the | f minimuu :1786, hav 1th as 165 surface by 1gth on 13 se test as p le even aff 6 (1ceme 12 in lorry as 1g the wate | ing to IS a and wic d on top n tail ler resistance be visib oock 1:3: sign 12 ers fited l pumpir | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hin complete. | | |
| | s per IS: 10910 m x 25 mm and etween ssary and uitable to with ctures es with gregate 20 mm 568.88 of 5 km s than 3 m using | Rs lated as s 23 m space b es neces g and s manufa nanhol one agg No. Rs stance of d cost of | (<i>i</i>) stic encapsu oss section a um 112 mm s sering beside dard drawing and having i ng fixing in r 6 graded sto 12 (<i>i</i>) er from a dis pir of height opliences and 138.384 138.384 | num cro minimu r chequ er stand cations ncludir e sand: ing wat reserve other ap | n 6 mm th ving minin mm with i v ribbing o 8 mm as p ber specific ter fixing i nt: 3 coars No. No. nd convey er into the tools and o | f minimuu :1786, hav 1th as 165 surface by ugth on 13 see test as p le even aff 6 (1ceme 12 in lorry as ug the wate ker lorry, 6.2 | ing to IS a and wic d on top n tail ler resistance be visib oock 1:3: sign 12 ers fited l pumpir | Providing orange colour safety for on 12 mm dia steeel bar conform over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bin nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hin | | |

| | 50mm dia G.I5.17kg/m , | 32mm di | ia GI-3.17 | kg/m | | | | | |
|----------|--|---|--|--|---|---|---|--|---|
| | Outer total-45.8m/1m c/c vertical 50mm dia | 16 | | | 0.75 | 5 17 | 1. ~ | 170.27 | |
| | vertical Johnin dia | 46 | | | 0.75 | 5.17 | кg | 178.37 | |
| | Horizontal 0.25m c/c-32mm dia | 1 3 | 45.8 | | | 3.17 | kg | 435.56 | |
| | Say | | 613.923 | kg | | a | Rs | 194.18 | 119211.05 |
| | Finishing with Deluxe Multi sur | face pain | t system f | or interiors | and ex | teriors usin | g prime | er as per | |
| 15 13.4 | 8.3 manufacturers specifications: | - | | | 1 | 1 | 1 | | |
| | vertical pipe | 46 | 0.75 | | 0.05 | 1.725 | | | |
| | Horizontal pipe | 3 | 45.8 | | 0.03 | 4.40 | m2 | | |
| | Say | | 6.12 | | | | Rs | 154.62 | 946.50 |
| 16 13.52 | | or more | coats) at a | all location | s prepa | red and app | lied as | per | |
| | Base slab & inside walls | 1 | 254.48 | | | 0 | | 254.48 | |
| | Say | | 254.483 | m2 | | a | Rs | 232.68 | 59211.80 |
| | Total-MBBR Tank-3 | | | | | | | | 2680890.67 |
| MOVIN | G BED BIOFILM REACTOR T | ANK- B | OD REM | | FER D | ENITRIFIC | CATIC | DN | |
| m Cod | e Description | No | L | В | Н | V | | Rate | Amount |
| | Shape of tank | 1 | | - | | 2 for circula | | | |
| | Earth work in excavation by me 1.5 m in width as well as 10 sqr | | | | | | | | |
| | 1.5 m, as directed by Engineer-i | - | · · | 5 8 8 « | | | | | |
| 1 2.6.1 | | | | | | | - | | |
| | MBBR Tank-base | 1 | 5.40 | 5.4 | 0.90 | 26.24 | | | |
| | Total | | | _ | | 26.24 | | | |
| | Say | | 26.24 | | |) | Rs | 223.41 | 5862.1 |
| | Random rubble masonry in har | | n foundati | on and pl | nth inc | luding level | lling up | with cement cor | ncrete 1:6:12 up to |
| 2 7.1.1 | plinth level with cement mortar | 1:6 | | | | | | | |
| 2 7.1.1 | MBBR Tank-base | 1 | 5.40 | 5.4 | 0.45 | 13.12 | m ³ | | |
| | | | | | | | | | |
| | | 1 | 5.40 | | 0.45 | | | | |
| | Total | 1 | | | 0.43 | 13.12 | m ³ | 7520.41 | 00//7 7/ |
| | | 1 | 13.12 | | 0.43 | 13.12 | | 7520.41 | 98667.70 |
| | Total | n cement | 13.12 | m ³ | | 13.12 @ | m ³ Rs | | |
| 3 4.1.6 | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 | | 13.12 concrete | m ³ of specifi | ed grad | 13.12 (a) le excluding 5 graded stor | m ³ Rs the cone aggr | ost of centering an | nd shuttering - Al |
| 3 4.1.6 | Total Say Providing and laying in positio | | 13.12 concrete | m ³ of specifi | ed grad | 13.12 @ le excluding | m ³ Rs the cone aggr | ost of centering an | nd shuttering - Al |
| 3 4.1.6 | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 | | 13.12 concrete : 3 coarse | m ³ of specifi sand (zon | ed grac e-III): 6 | 13.12 (a) le excluding 5 graded stor | m ³ Rs the cone aggr m ³ | ost of centering an | nd shuttering - Al |
| 3 4.1.6 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1 MBBR tank-base | | 13.12 concrete : 3 coarse | m ³ of specifi sand (zon 5.4 | ed grac e-III): 6 | 13.12 @ de excluding graded stor 4.37 4.37 | m ³ Rs the cone aggr m ³ | ost of centering an | nd shuttering - Al iinal size) |
| 3 4.1.6 | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 MBBR tank-base Total Say | Cement 1 | 13.12 concrete : 3 coarse 5.4 4.37 | m ³ of specifi sand (zon 5.4 m ³ | ed grac e-III): (0.15 | 13.12 @ le excluding graded stor 4.37 4.37 @ | m ³ Rs the cone aggr m ³ m ³ Rs | ost of centering an egate 40 mm nom | ainal size) 32893.26 |
| 3 4.1.6 | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 MBBR tank-base Total Say Providing and laying in positio | Cement 1 | 13.12 concrete : 3 coarse 5.4 4.37 nixed M-3 | m ³ of specifi sand (zon 5.4 m ³ 60 grade c | ed grac e-III): (0.15 | 13.12 @ le excluding graded stor 4.37 4.37 @ for reinford | m ³ Rs the cone aggr m ³ m ³ Rs ced cer | ost of centering an egate 40 mm nom 7527.06 nent concrete wor | nd shuttering - Al ninal size) 32893.20 rk, using Sulphate |
| 3 4.1.6 | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 MBBR tank-base Total Say Providing and laying in positio Resistant Cement (SRC) cor | Cement 1 n ready r itent as j | 13.12 concrete : 3 coarse 5.4 4.37 nixed M-3 per appro | m ³ of specifi sand (zon 5.4 m ³ 00 grade c ved design | ed grac e-III): 6 0.15 oncrete 1 mix, | 13.12 @ le excluding graded stor 4.37 4.37 @ for reinford manufactur | m ³ Rs the cone aggr m ³ m ³ Rs ced cen ed in | ost of centering au egate 40 mm nom 7527.06 nent concrete wor fully automatic b | nd shuttering - Al ainal size) 32893.20 rk, using Sulphate patching plant and |
| 3 4.1.6 | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 MBBR tank-base Total Say Providing and laying in positio Resistant Cement (SRC) con transported to site of work in transported | Cement 1 n ready r ansit mix | 13.12 a concrete : 3 coarse 5.4 4.37 nixed M-3 per appro er for all l | m ³ of specifi sand (zon 5.4 m ³ 60 grade c ved design eads, havi | ed grac e-III): 6 0.15 oncrete n mix, ng cont | 13.12 @ le excluding 5 graded stor 4.37 4.37 @ for reinforce manufactur inuous agita | m ³ Rs the cone aggr m ³ Rs Rs ced cer ed in tted mi | ost of centering au egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured | nd shuttering - Al ainal size) 32893.20 rk, using Sulphat patching plant and a sper mix design |
| 3 4.1.6 | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 MBBR tank-base Total Say Providing and laying in positio Resistant Cement (SRC) con transported to site of work in transported to site of reinforce | Cement 1 n ready r ansit mix d cement | 13.12 a concrete : 3 coarse 5.4 4.37 nixed M-3 per appro- er for all l concrete | m ³ of specifi sand (zon 5.4 m ³ 60 grade c ved design eads, havi work, inclu | ed grac e-III): 6 0.15 oncrete n mix, ng cont uding p | 13.12 @ le excluding 5 graded stor 4.37 4.37 @ for reinforce manufactur inuous agita umping of F | m ³ Rs the cone aggr m ³ Rs Rs ced cerr ed in tted mit X.M.C. | ost of centering au egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe | nd shuttering - Al ainal size) 32893.20 rk, using Sulphate patching plant and a sper mix design er to site of laying |
| 3 4.1.6 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1 MBBR tank-base Total Say Providing and laying in position Resistant Cement (SRC) cort transported to site of work in transported to site of centering excluding the cost of centering | n ready r ansit mix d cement g, shutter | 13.12 a concrete : 3 coarse 5.4 4.37 nixed M-3 per approver for all 1 concrete ving finish | m ³ of specifi sand (zon 5.4 m ³ 60 grade c ved design eads, havi work, inch ing and ro | ed grad e-III): (0.15 oncrete n mix, ng cont uding p | 13.12 @ le excluding 5 graded stor 4.37 4.37 6 or reinforce manufactur inuous agita umping of F ement, inclu | m ³ Rs the conce aggr m ³ Rs red cerr ed in tted mit X.M.C. ding c | ost of centering au egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixtures | nd shuttering - Al ainal size) 32893.20 rk, using Sulphat patching plant and a sper mix design er to site of laying s in recommended |
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| 5.37.+ | Total Say Providing and laying in positio work up to plinth level : 1:3:6 (1 MBBR tank-base Total Say Providing and laying in positio Resistant Cement (SRC) corditration transported to site of work in the of specified grade for reinforce excluding the cost of centering proportions as per IS : 9103 to durability as per direction of the specified grade as the second seco | n ready r tent as p ansit mix d cement g, shutter accelerat the Eng per desig | 13.12 a concrete : 3 coarse 5.4 4.37 nixed M-3 per approver for all 1 concrete wing finish te/ retard s gineer-in-c gn mix is p 5.4 | m ³ of specifi sand (zon 5.4 m ³ 00 grade c ved design eads, havi work, inclu- ing and re- setting of of harge. (N bayable/rec 5.4 | ed grac e-III): 6 0.15 oncrete n mix, ng cont uding p einforce concret ote :- overab | 13.12 @ te excluding 5 graded stor 4.37 4.37 @ for reinford manufactur inuous agita umping of F ement, inclu e, improve of Cement co le separately | m ³ Rs the come aggr m ³ m ³ Rs ced cerr ed in τ tted mit λ.M.C. ding c workab ntent or r). m ³ | ost of centering au egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixtures ility without impa | nd shuttering - Al ainal size) 32893.20 rk, using Sulphate batching plant and a sper mix design er to site of laying s in recommended airing strength and |
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| | | m | 20.66 | 4.10 | 0.30 | 8.40 | 2 | Tank walls | |
|---|--|--|--|---|---|--|--|---|-------------|
| | | | 0.89 | 0.1 | 0.45 | 4.95 | 4 | Walkway | |
| | | | | | | | | | |
| | | | 21.56 | | | | | Total | |
| 261446.2 | 12129.26 | Rs | | | m ³ | 21.56 | | Say | |
| 201110.2 | 1212/120 | rt5 | . Contraction of the second seco | | | 21.00 | | | 5.22.6 |
| n position an | 00D or more. | | | Treated | hanically | | | | +OD1 5 6 |
| | 6291.60 | kg/m³ | 120 | m' | 52.43 | | 1 | Quantity as per item No.4a & 4 | |
| | 6291.60 | | | | | | | Total | |
| 660047.0 | 104.91 | Rs | a | | kg | 6291.6 | | Say | |
| cement as pe | doses by weight | vork in | t concrete w | | | proofing n | water p | Extra for providing and mixing manufacturer's specification. | 6 4.12 |
| | 17826.20 | kg/m ³ | 340 | m ³ | 52.43 | | 1 | Quantity as per item No.2 | |
| | 17826.20 | | | | | | | Total | |
| 25229.4 | 70.77 | Rs | (a) | | bags | 356.52 | | Say | |
| | | | | | | | | | |
| tings, bases o | or :Foundations, | | - | | pping etc. | tting, pro | ling stru | Centering and shuttering include columns, etc. for mass concrete | 7 5.9.1 |
| | | | 6.30 | 0.35 | | 9.00 | 2 | Bottom slab | |
| | | m^2 | 6.30 | | | | | Total | |
| 2205.0 | 350.00 | Rs | @ | | m^2 | 6.30 | | Say | |
| | | | 73.8 | 4.10 | rses etc. | string cou 9.00 7.80 | inth and 2 2 | attached pilasters, butteresses, pl For walls outside For walls inside | 8 5.9.2 |
| | | 111 | 8.7 | 4.10 | 0.5 | 4.35 | 4 | | |
| | | | | | | | | Walkway | |
| | | 2 | | | 0.5 | 4.33 | - | | |
| nt to the RC | | Rs for wa | 146.46 @ in nature | | m ² y of hydi | 146.46 Iline slurr | l crysta | Total Say Providing and applying integra | |
| treatment plan slurry : 2 part es and applyin requirements a d with contro slurry shall b | terproofing treat ior, sewage & wa' s integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall | Rs for wa reserve (5 part (5 part water) to the mat 7 more gative s | 146.46 (a) in nature pos, podiums, tio of 5 : 2 rry : 1 part y poer brush. T concrete by ssure on neg | oof slab n the ra line slu hetic fil lity of tic pres | m ² y of hydr er tanks, r y mixing i ral crystal lp of syntl permeabi r hydrosta | 146.46 Illine slurr ment, wat repared by parts integ ith the he reducing to 16 ba | ll crysta the base k etc., p 3 : 1 (3 p l) side w i.e by resistant | Total Say | |
| nt to the RCu treatment plan slurry : 2 part es and applyin requirements a d with contro slurry shall b er specificatio | terproofing treat ior, sewage & wa s integral crystall for horizontal sur- erial shall meet the than 90% comp side. The crystall out all complete a | Rs for wa reserve (5 part water) f the mat 7 more gative s arried o | 146.46 (a) in nature ps, podiums, tito of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on neg rk shall be c | oof slat n the ra line slu hetic fil lity of tic pres | m ² y of hydr er tanks, re y mixing i ral crystal lp of syntl permeabi r hydrosta 0.50mm. T product p | 146.46 lline slurr ment, wat repared b parts integ ith the he reducing to 16 ba width of arge. The | l crysta the base k etc., p 3 : 1 (3 p l) side w i.e by resistant s up to a ver-in-cha | Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and i the same from negative (interna specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine | |
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| nt to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro slurry shall b er specificatio ars against an 38073.8 Int to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro slurry shall b er specificatio | terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a guarantee for 10 595.28 terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a | Rs for wa reservi (5 part water) t he mat maried carry g m ² m ² Rs for wa reservi (5 part water) t he mat maried (5 part | 146.46 @ in nature os, podiums, titio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg ck shall be c bance shall 63.96 63.96 m of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg with of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg shall be c | boof slab n the radius line slu hetic fil lity of tic pres Che word 4.10 cophilic | m ² y of hydri er tanks, ru y mixing i ral crystal lp of syntl permeabi r hydrosta 0.50mm. T product p product p product p or sqm m ² y of hydri er tanks, ru y mixing i ral crystal lp of syntl permeabi r hydrosta 0.50mm. T | 146.46 Illine slurr ment, wat repared by barts integ ith the he reducing to 16 ba width of arge. The 0.70 kg p 7.80 63.96 Illine slurr ment, wat repared by barts integ ith the he reducing to 16 ba | Il crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant coats @ 2 2 1 crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant coats @ 2 1 crysta the base k etc., p | Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 1 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine 1 leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 1 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks | 9 22.23. |
| nt to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro- slurry shall b er specification ars against ar 38073.8 Int to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro- slurry shall b er specification | terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a guarantee for 10 595.28 terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a | Rs for wa reservi (5 part water) t he mat maried carry g m ² m ² Rs for wa reservi (5 part water) t he mat maried (5 part | 146.46 @ in nature os, podiums, titio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg ck shall be c bance shall 63.96 63.96 m of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg with of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg shall be c | boof slab n the radius line slu hetic fil lity of tic pres Che word 4.10 cophilic | m ² y of hydri er tanks, rry y mixing i ral crystal lp of synti permeabi r hydrosta 0.50mm. T product p er sqm m ² y of hydri er tanks, rry y mixing i ral crystal lp of synti permeabi r hydrosta 0.50mm. T product p | 146.46 Iline slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The 0.70 kg p 7.80 63.96 Iline slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The | Il crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant s up to a eer-in-chi coats @ 2 2 1 crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant s up to a er-in-chi coats w i.e by resistant s up to a s er-in-chi s ide w i.e by coats w i.e by coats w i.e b | Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 1 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine Ileakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 1 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and | |
| nt to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro slurry shall b er specificatio ars against an 38073.8 Int to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro slurry shall b er specificatio | terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a guarantee for 10 595.28 terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a | Rs for wa reservi (5 part water) f he mat more gative s arried of carry g m ² m ² Rs for wa reservi (5 part water) f he mat mater mater for wa reservi (5 part m ² (5 part m ² Rs | 146.46 @ in nature os, podiums, titio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg ck shall be c bance shall 63.96 63.96 m of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg with of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on neg shall be c | boof slab n the radius line slu hetic fil lity of tic pres Che word 4.10 cophilic | m ² y of hydri er tanks, rry y mixing i ral crystal lp of synti permeabi r hydrosta 0.50mm. T product p er sqm m ² y of hydri er tanks, rry y mixing i ral crystal lp of synti permeabi r hydrosta 0.50mm. T product p | 146.46 Iline slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The 0.70 kg p 7.80 63.96 Iline slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The | Il crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant s up to a eer-in-chi coats @ 2 2 1 crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant s up to a er-in-chi coats w i.e by resistant s up to a s er-in-chi s ide w i.e by coats w i.e by coats w i.e b | Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 1 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 1 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine | |
| nt to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro slurry shall b er specificatio ars against an 38073.8 Int to the RC treatment plan slurry : 2 par es and applyin requirements a d with contro slurry shall b er specificatio | terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a guarantee for 10 595.28 terproofing treat ior, sewage & wa's integral crystall for horizontal sur- erial shall meet th than 90% comp side. The crystall out all complete a | Rs for wa reservi (5 part water) f the mat more gative s arried of carry g m ² Rs for wa reservi (5 part water) f the mat mater mater mater mater mater for wa reservi (5 part mater mate | 146.46 @ in nature ps, podiums, ps, podiums, ptio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on neg ck shall be c pance shall 63.96 @ in nature ps, podiums, ptio of 5 : 2 rry : 1 part y per brush. T concrete by ssure on neg ck shall be c per brush. T concrete by ssure on neg ck shall be c pance shall | boof slab n the radius line slu hetic fil lity of tic pres Che word 4.10 cophilic | m ² y of hydri er tanks, re y mixing i ral crystal lp of syntl permeabi r hydrosta 0.50mm. T product p er sqm m ² y of hydri er tanks, re y mixing i ral crystal lp of syntl permeabi r hydrosta 0.50mm. T product p per sqm. | 146.46 Illine slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The 0.70 kg p 7.80 63.96 Illine slurr ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The 2.110 kg | Il crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant s up to a eer-in-chi coats @ 2 2 1 crysta the base k etc., p 3 : 1 (3 µ l) side w i.e by resistant s up to a er-in-chi coats w i.e by resistant s up to a s er-in-chi s ide w i.e by coats w i.e by coats w i.e b | Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and it the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine I leakage. For vertical surface two Inside of walls Total Say Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and it the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine 2 leakage. For horizontal surface o | |

| 11 13.7. | 1 12 mm cement plaster finished w | ith a flo | ating coat | of neat cer | ment :1 | :3 (1 cemen | t : 3 fin | e sand) | |
|----------|--|-------------------|--------------------------|------------------------|-------------------|----------------------------|--------------------------------|---------------------|-----------|
| | Inside of walls | 2 | 7.80 | | 4.10 | 63.96 | | | |
| | Outside of walls | 2 | 9.00 | | 4.40 | 79.2 | | | |
| | Base slab inside | 1 | 3.90 | 3.9 | | 15.21 | | | |
| | Walkway | 4 | 4.95 | | | 19.80 | | | |
| | Total | | | | | 178.17 | m ² | | |
| | Say | | 178.17 | m ² | | | Rs | 418.79 | 74615.33 |
| | Providing orange colour safety for | ot rest c | | | ick plas | stic encapsu | lated as | s per IS: 10910 | |
| 12 19.16 | on 12 mm dia steeel bar conformi over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections o | and wid on top | 1th as 165 surface by | mm with r ribbing o | minimu r chequ | m 112 mm a ering beside | space b es neces g and s | etween ssary and | |
| | Say | 12 | 12 | No. | | | Rs | 568.88 | 6826.56 |
| | Filling water with 5000 litre tank | are fited | | | ina wat |) | | | 0820.30 |
| 13 100.3 | 5 HP diesel engine pump set , hir complete. | e for tan | ker lorry, 3.9 | | other ap | 54.756 54.756 | m3 | of water etc. | |
| | Say | | 54.76 | Kilo litre | | | Rs | 218.95 | 11988.66 |
| 14 10.26 | Providing and fixing hand rail of 5.3 staircase railing and similar work 50mm dia G.I5.17kg/m , 32mm | s, incluc | ling apply | ing primin | | | | | |
| | Outer total 19.8m/1m c/c | uia OI- | 5.17Kg/III | | | | 1 | r + | |
| | vertical 50mm dia | 20 | | | 0.75 | 5.17 | kg | 77.55 | |
| | Horizontal 0.25m c/c-32mm dia | 3 | 19.8 | | | 3.17 | kg | 188.30 | |
| | Say | | 265.85 | kg | | | Rs | 194.18 | 51622.14 |
| 15 13.48 | 3.3 Finishing with Deluxe Multi surfa | ace pain | | | s and ex | teriors usin | g prime | er as per | |
| | vertical pipe | 20 | 0.75 | | 0.05 | | | | |
| | Horizontal pipe | 3 | 19.8 | | 0.03 | 1.9008 | m2 | | |
| | Say | | 2.65 | m2 | | (a) | Rs | 154.62 | 409.8 |
| 16 13.52 | Finishing with Epoxy paint (two manufacturer's specifications incl | | coats) at a | all location | | | | | |
| | Base slab & inside walls | 1 | 79.17 | | | 0 | | 79.17 | |
| | Say | | 79.17 | m2 | | @ | Rs | 232.68 | 18420.9 |
| | Total-MBBR Tank-4 | | | | | | | | 1511120.6 |
| ECOND | DARY CLARIFIER WITH PLAT | E SETT | LER | | | | | | |
| n Code | | No | L | В | H | V | Unit | Rate A | Mount |
| 1 2.6.1 | Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in | on plan | | | | | | | |
| | For clarifier | 1 | 6.55 | 6.55 | 1.5 | 64.35 | m ³ | | |
| | Say | | 64.35 | | 1.0 | 01.55 | | I | |
| | Do for itemAll kinds of soil | 0.35 | 64.35 | | | 22.5225 | @Rs | 223.41 | 5031.6 |
| | Do for itemOrdinay rock | 0.35 | 64.35 | | | 22.5225 | @Rs | 433.01 | 9752.4 |
| | Medium rock with blasting | 0.15 | 230.64 | | | 34.596 | | 541.27 | 18725.6 |
| | Medium rock with out blasting | 0.10 | 230.04 | | | 54.570 | wits | 541.27 | 10/20.00 |

| | | Providing and laying in positior | cement | concrete | of specifi | ed orad | le excluding | the co | ost of centering a | nd shuttering - All |
|---|-----------------------|---|---|---|---|---|---|--|---|---|
| 2 | 4.1.6 | work up to plinth level : 1:3:6 (1 | | | | | | | | |
| | | For clarifier foundation | 1 | 6.55 | 6.55 | 0.15 | 6.44 | m ³ | | |
| | | Total | | | | | 6.44 | m ³ | | |
| | | Say | | 6.44 | m ³ | | <i>a</i> | Rs | 7527.06 | 48474.27 |
| | 5.37.1 + 5.34.1 | Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tra of specified grade for reinforced excluding the cost of centering proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab-raft beam slab type Base slab-inverted beams Total | ent as p nsit mix cement , shutter accelerat the Eng | ber appro- er for all l concrete v ing finish re/ retard s gineer-in-c gn mix is p <u>6.55</u> 5.00 | ved design eads, havi work, inclu- ing and ro- setting of o setting of o setting of o sharge. (N bayable/rec <u>6.55</u> 0.35 | n mix, ng cont uding p einforce concret ote :- | manufactur inuous agita umping of H ement, inclu e, improve Cement co le separately | ed in the international state of the internation | fully automatic b xer, manufactured from transit mixe ost of admixtures ility without impa- considered in thi | atching plant and as per mix design r to site of laying, s in recommended airing strength and |
| | | Say | | 18.17 | m³ | | | Rs | 10404.79 | 189012.12 |
| | 5.37.2 + 5.34.1 | Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tra of specified grade for reinforced excluding the cost of centering proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as | ent as p nsit mix cement , shutter accelerat the Eng | per appro- er for all l concrete ing finish re/ retard s gineer-in-c | ved design eads, havin work, inclu- ing and re- setting of or wharge. (N | n mix, ng cont uding p einforce concret ote :- | manufactur inuous agita umping of F ement, inclu e, improve Cement co | ed in t ited mit R.M.C. iding c workab ntent c | fully automatic b kxer, manufactured from transit mixe ost of admixtures ility without impa- considered in thi | atching plant and l as per mix design r to site of laying, s in recommended airing strength and |
| - | | Columns-long | 4 | 0.35 | | | T | | | |
| | | Columns-short | 4 | 0.35 | | 0.4 | 0.20 | | | |
| | | Clarifier-square container | 4 | 5.05 | | 2.9 | | | | |
| | | Clarifier-hopper container | 4 | 3.68 | | 2.77 | 12.20 | | | |
| | | Top beams | 4 | 5.00 | | 0.45 | 3.15 | | | |
| | | Walk way | 4 | 5.80 | | 0.10 | | | | |
| | | Total | | | | | 36.71 | m ³ | | |
| | | Deductions | | | | | | | | |
| | | Inlet pipe | 1 | 0.031 | 0.3 | | 0.01 | m ³ | | |
| | | Total | | | | | 36.70 | m ³ | | |
| | | Say | | 36.70 | m ³ | | 1 | Rs | 12142.28 | 445628.24 |
| 5 | 5.22.6 +od16 | Epoxy coated steel reinforceme binding all complete upto plinth | | R.C.C. wo | ork includ chanically | Treated | aightening, l bars of gra | cutting de Fe-5 | , bending, placin 500D or more. | g in position and |
| _ | | Quantity as per item No.3 | 1 | | 18.17 | | | kg/m^3 | 2179.91 | - |
| | | Quantity as per item No.4 | 1 | | 36.70 | m | 120 | kg/m ³ | 4404.06 | 5 |
| | | Total | | | | | | | 6583.97 | 6 |
| (| 4.10 | Say Extra for providing and mixing | water p | 6583.97 proofing n | | cemen | | Rs vork in | 104.91 doses by weight | 690719.22 |
| 6 | 4.12 | manufacturer's specification. | <u> </u> | | | | | 1 , 3 | | |
| | | Quantity as per item No.3 | 1 | | 18.17 | | | kg/m ³ | 6176.40 | |
| | | Quantity as per item No.4 | 1 | | 36.70 | m3 | 340 | kg/m ³ | 12478.18 | - |
| _ | | Total | | | | | _ | | 18654.58 | |
| | | Say | | 373.092 | bags | | a | Rs | 70.77 | 26401.82 |

| lations, footings, ba | | | | | | | | columns, etc. for mass concrete | 5.9.1 |
|---|--|--|--|--|---|--|--|--|-----------|
| | | | 9.17 | 0.35 | | 6.55 | 4 | Base slab-raft beam slab type | |
| | | | 9.63 | 0.45 | | 5.35 | 4 | Base slab-inverted beams | |
| | n^2 | 7 n | 8.37 | 0.45 | | 4.65 | 4 | Base slab-inverted beams | |
| | | | 11.60 | 0.5 | | 5.80 | 4 | Walkway | |
| | n^2 | 7 n | 38.77 | | | | | Total | |
| 350.00 135 | .s | D) F | @ | | m ² | 38.77 | | Say | |
| l crystalline slurry : 2 ontal surfaces and ap ll meet the requireme % compared with c crystalline slurry sl mplete as per specifi | parts integra iter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee | 2 (f wa The oy ega cai | atio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne rk shall be c hance shall | in the ra lline slut hetic fit lity of atic pres | y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. T product | epared by arts integ th the he reducing to 16 ba width of 0 rge. The | k etc., pr 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 2 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two | 3 22.23.1 |
| | n^2 | 1 n | 55.1 | 2.9 | | 4.75 | 4 | Inside of walls-upper | |
| | n^2 | 4 n | 37.34 | 2.77 | | 3.38 | 4 | Inside of walls-lower | |
| | | | 92.44 | | | | | Total | |
| 595.28 550 | S | i) F | (a) | | m^2 | 92.44 | | Say | |
| ge & water treatment crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl | eservior, sewa parts integra tter) for horiz material sha more than 90 tive side. The | s, r 2 (5 : wa Th Dy ega | os, podiums, atio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne | oof slab in the ra lline sluu hetic fit lity of atic pres | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta | line slurr nent, wate epared by arts integ th the he reducing to 16 ba | the bases k etc., pr 3 : 1 (3 p) side w i.e by resistant | Providing and applying integra structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 2 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and | |
| ge & water treatment crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi | eservior, sewa parts integra iter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee | s, r 2 (5 2 wa The Dy ega cai cai | os, podiums, atio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne rk shall be c nance shall | oof slab in the ra lline sluu hetic fit lity of atic pres | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. T product | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of 0 rge. The | the basen k etc., provide the state b : 1 (3 provide the state b) side w i.e by resistant up to a er-in-cha | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 2 the same from negative (internal specified in ACI 212-3R-2010 | 22.23.2 |
| ge & water treatment crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi | eservior, sewa parts integra ter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee | s, r 2 (5 2 wa The Dy ega can can can can can can 0 n | os, podiums, atio of 5 : 2 rry : 1 part v ber brush. T concrete by ssure on ne rk shall be c nance shall 4.00 | oof slab in the ra lline sluu hetic fit lity of atic pres The wor perform | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. T product | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of 0 rge. The | the basen k etc., provide the state b : 1 (3 provide the state b) side w i.e by resistant up to a er-in-cha | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 2 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine | 22.23.2 |
| ge & water treatment crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi | eservior, sewa parts integra ter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee | s, r 2 (5 2 wa The Dy ega can can can can can can 0 n | os, podiums, atio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne rk shall be c nance shall | oof slab in the ra lline sluu hetic fit lity of atic pres The wor perform | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. T product p per sqm. 2 | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of (rge. The 01.10 kg 2.00 | the basen k etc., provide the state b : 1 (3 provide the state b) side w i.e by resistant up to a er-in-cha | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o | 22.23.2 |
| ge & water treatment crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi | esservior, sewa parts integra iter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee n^2 | s, r 2 (5 2 wa The Dy ega can can can can can can 0 n | os, podiums, atio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne rk shall be c nance shall 4.00 4.00 | oof slab in the ra lline sluu hetic fit lity of atic pres The wor perform | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. T product p per sqm. 2 | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of 0 rge. The 01.10 kg | the basen k etc., provide the state b : 1 (3 provide the state b) side w i.e by resistant up to a er-in-cha | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside | 22.23.2 |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz material sha more than 90 tive side. The ried out all co rry guarantee n^2 n^2 s | s, r 2 (5 2 wa The by ega can can can can can can can can can b R | os, podiums, atio of 5 : 2 rry : 1 part of ber brush. T concrete by ssure on ne, rk shall be c nance shall 4.00 4.00 @ | oof slab in the ra lline sluu hetic fit lity of atic pres The wor perform | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of (rge. The 01.10 kg 2.00 4.00 | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha ne coat (c 1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz material sha more than 90 tive side. The ried out all co rry guarantee n^2 s 3 fine sand) | s, r 2 (2 (2 + 2)) 2 (2 + 2) 2 + 3 + 2 2 + 3 | os, podiums, atio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne, rk shall be c nance shall 4.00 4.00 (@) :3 (1 cemen | oof slab in the ra lline sluu hetic fit lity of atic pres The wor perform | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of (rge. The 01.10 kg 2.00 4.00 | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha ne coat (c 1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz material sha more than 90 tive side. The ried out all cc rry guarantee r^2 3 fine sand) r^2 | s, r 2 (5 3 The by eega can 1 ca 0 n 0 n 0 n 1 ca 0 n 0 n 0 n | os, podiums, atio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne, rk shall be c nance shall 4.00 4.00 (@) :3 (1 cemen | oof slab in the ra lline sluu hetic fil lity of thic pres The wor perform ment :1 | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of 0 rge. The 1.10 kg 2.00 4.00 ting coat | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha he coat (1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee r^2 3 fine sand) r^2 | s, r 2 (2 3 The 2 marked 5 The 2 marked 5 marked 6 marked 6 marked 7 marked | os, podiums, atio of 5 : 2 rrry : 1 part y ber brush. T concrete by ssure on ne, rk shall be c nance shall 4.00 4.00 (<i>a</i>) :3 (1 cemen 55.10 | ment :1 2.97 | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² | tine slurr nent, wat epared by arts integ th the he reducing to 16 ba width of to rge. The 0.1.10 kg 2.00 4.00 ting coat 4.75 | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha ne coat (1 1 ith a floa | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w Inside of walls-upper | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee r^2 3 fine sand) r^2 | s, r 2 (5 2 wa The Dy ega can 1 ca 0 n 0 n 0 n 0 n 1 ca 0 n 0 n 0 n 0 n 0 n 0 n 0 n 0 n | bs, podiums, atio of 5 : 2 rry : 1 part + ber brush. T concrete by ssure on ne; rk shall be c hance shall 4.00 4.00 2.3 (1 cemen 55.10 37.34 | ment :1 2.97 | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² of neat ce | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of or rge. The 0.1.10 kg 2.00 4.00 ting coat 4.75 3.38 | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha ne coat (c 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w Inside of walls-upper Inside of walls-lower | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz e material sha more than 90 tive side. The ried out all co rry guarantee r^2 3 fine sand) r^2 | s, r 2 (5 2 wa The by ega can 1 ca 0 n 0 n 0 n 1 ca 0 n 0 n 1 ca 0 n 0 n 0 n 6 n | bs, podiums, atio of 5 : 2 rry : 1 part of ber brush. T concrete by ssure on ne, rk shall be c nance shall 4.00 4.00 (a) (3 (1 cemen) 55.10 37.34 4.00 | even of slab in the ra lline sluu hetic fit lity of atic press The wor perform ement :1 2.9 2.77 | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² of neat ce | line slurr nent, wate epared by arts integ th the he reducing to 16 ba width of 0 rge. The 0.1.10 kg 2.00 4.00 ting coat 4.75 3.38 2.00 | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a ecr-in-cha ecoat (c 1 ith a floa 4 4 4 1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w Inside of walls-lower Base slab inside | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz more than 90 tive side. The ried out all co rry guarantee n^2 3 fine sand) n^2 | s, r 2 (5 2 mail car The py ega car car car car car car car car car ca | bs, podiums, atio of 5 : 2 rry : 1 part of ber brush. T concrete by ssure on ne, rk shall be c hance shall 4.00 4.00 37.34 4.00 62.06 44.26 23.20 | ment :1 2.9 2.9 | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² of neat ce | line slurr nent, wate epared by arts integ th the he reducing to 16 ba width of 0 rge. The 0.1.10 kg 2.00 4.00 ting coat 4.75 3.38 2.00 5.35 | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha he coat (1 1 1 1 1 1 1 4 4 4 1 4 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w Inside of walls-upper Inside of walls-lower Base slab inside Outside of walls-upper | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ll meet the requirement % compared with of crystalline slurry sl mplete as per specifi for 10 years again | eservior, sewa parts integra ter) for horiz more than 90 tive side. The ried out all co rry guarantee n^2 3 fine sand) n^2 | s, r 2 (5 2 mail car The py ega car car car car car car car car car ca | bs, podiums, atio of 5 : 2 rry : 1 part of ber brush. T concrete by ssure on ne, rk shall be c hance shall 4.00 4.00 37.34 4.00 62.06 44.26 | ment :1 2.9 2.9 | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² of neat ce | line slurr nent, wat epared by arts integ th the he reducing to 16 ba width of (rge. The 01.10 kg 2.00 4.00 ting coat 4.75 3.38 2.00 5.35 3.98 5.80 | the base k etc., p is $1 (3 p)k$ etc., p is 1 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w Inside of walls-upper Inside of walls-lower Base slab inside Outside of walls-lower | |
| ge & water treatment l crystalline slurry : 2 ontal surfaces and ap ill meet the requireme % compared with of crystalline slurry sl mplete as per specifi for 10 years again 458.77 18 458.77 18 418.79 940 | eservior, sewa parts integra iter) for horiz material sha more than 90 tive side. The ried out all co rry guarantee 1 3 fine sand) 1 1 1 1 1 1 1 1 1 1 1 1 1 | s, r 2 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5 (5 | bs, podiums, atio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne, rk shall be c nance shall 4.00 4.00 37.34 4.00 62.06 44.26 23.20 225.96 (@ | ment :1 2.9 2.77 2.9 2.78 | y of hydr er tanks, r y mixing i ral crystal lp of synt permeabi r hydrosta 0.50mm. 7 product p per sqm. 2 m ² of neat ce 2 m ² m ² | line slurr nent, wate epared by arts integ th the he reducing to 16 ba width of 0 rge. The 0.1.10 kg 2.00 4.00 ting coat 4.75 3.38 2.00 5.35 3.98 5.80 225.96 | the based k etc., pp 3 : 1 (3 p) side w i.e by resistant up to a er-in-cha e coat (0 1 1 1 1 1 1 4 4 4 4 4 4 4 4 | structures like retaining walls of tunnels / subway and bridge dec water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface o Bottom slab inside Total Say 12 mm cement plaster finished w Inside of walls-upper Inside of walls-lower Base slab inside Outside of walls-upper Outside of walls-lower Walkway | |

| | | | 16 | | | | 16 | No. | | |
|---------|-----------------------|---|---|---|--|--|---|---|--|--|
| | | Say | 10 | 16 | No. | | | Rs | 568.88 | 9102.08 |
| | | Filling water with 5000 litre tank | ers fited | | | ing wat | \cup | | | 7102.00 |
| | | (average) to the reservoir site and | | | | | | | | |
| | | 5 HP diesel engine pump set, hir | | | | | | | | |
| 13 | 100.36 | complete. | - | | - | | - | | | |
| | | | 1 | 4.75 | 4.75 | 4.8 | 108.3 | m3 | | |
| | | Total | | | | | 108.3 | | | |
| | | Say | | 108.30 | Kilo litre | | a. | Rs | 218.95 | 23711.95 |
| | | Providing and fixing hand rail of | approve | | | c. to ste | Ŷ | | alcony railing, | |
| 14 | 10.26.3 | staircase railing and similar work | | | | | | | | |
| | | 50mm dia G.I5.17kg/m , 32mm | n dia GI- | -3.17kg/m | | | | | | |
| | | Outer total 23.2m/1m c/c | | | | | | | | |
| | | vertical 50mm dia | 23 | | | 0.75 | 5.17 | kg | 89.18 | |
| | | Horizontal 0.25m c/c-32mm dia | 3 | 23.2 | | | 3.17 | kg | 220.63 | |
| | | Say | | 309.815 | kg | | | Rs | 194.18 | 60159.52 |
| | | Finishing with Deluxe Multi surfa | ace pain | | 0 | and ex |) | | | |
| | | manufacturers specifications: | . r.am | - , | | | | 0 Print | ···· r ··· | |
| 15 | 13.48.3 | - | | | 1 | | 1 | | | |
| | | vertical pipe | 23 | 0.75 | | 0.05 | 0.8625 | m2 | | |
| | | Horizontal pipe | 3 | 23.2 | | 0.03 | 2.23 | m2 | | |
| | | Say | | 3.09 | m2 | | <i>(a)</i> | Rs | 154.62 | 477.73 |
| | | Finishing with Epoxy paint (two | or more | coats) at a | all location | s prepa | red and app | lied as | per | |
| 16 | 13.52.2 | manufacturer's specifications incl On concrete work | luding a | ppropriate | priming c | oat, pre | eparation of | surfac | e, etc. complete. | |
| | | Base slab & inside walls | 1 | 96.44 | | | 0 | | 96.44 | |
| | | Say | | 96.44 | m2 | | | Rs | 222.69 | |
| | | Suy | | 2011 | 1112 | | u | 11.5 | 232.68 | 22439.37 |
| | | , , | Plate S | | 1112 | | u | IX3 | 232.68 | 22439.37 1745781.56 |
| SLI | JDGE S | Total-Secondary Clarifier with SUMP-circular | Plate S | | 1112 | | <u>u</u> | 105 | 232.68 | |
| m | JDGE S | Total-Secondary Clarifier with | Plate S | | | | | 103 | 232.68 | |
| m | | Total-Secondary Clarifier with | Plate S | | | | | | 232.08 | |
| m | Item | Total-Secondary Clarifier with SUMP-circular | | | | н | | | | 1745781.56 |
| m | Item | Total-Secondary Clarifier with SUMP-circular Description | No | Settler L | В | H | V | Unit | Rate | 1745781.56 Amount |
| m | Item | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec | No hanical | Settler L means (Hy | B ydraulic ex | cavato | V r)/manual m | Unit eans o | Rate ver areas (exceedi | 1745781.56 Amount ng 30 cm in depth, |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description | No hanical on plan | L means (Hy)) including | B ydraulic ex | cavato | V r)/manual m | Unit eans o | Rate ver areas (exceedi | 1745781.56 Amount ng 30 cm in depth, |
| m No | Item | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in | No hanical on plan | L means (Hy) including | B ydraulic ex g getting o | cavato | V r)/manual m lisposal of e | Unit eans o | Rate ver areas (exceedi | 1745781.56 Amount ng 30 cm in depth, |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump | No hanical on plan | L means (Hy)) including | B ydraulic ex g getting o | cavato | V r)/manual m disposal of e 9 | Unit eans o excavat | Rate ver areas (exceedi | 1745781.56 Amount ng 30 cm in depth, |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total | No hanical on plan | L means (Hy) including | B ydraulic ex g getting o 3 | cavato | V r)/manual m lisposal of e 9 9 | Unit eans o excavat m ³ m ³ | Rate ver areas (exceedi ed earth lead upto | Amount ng 30 cm in depth, 50 m and lift upto |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say | No hanical on plan -charge 1 | L means (Hy) including 3 9 | B ydraulic ex g getting o 3 m ³ | cavator ut and c | V r)/manual m lisposal of e 9 9 0 @ | Unit eans o xcavat m ³ m ³ Rs | Rate ver areas (exceedi ed earth lead upto 223.41 | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say Random rubble masonry in hard s | No hanical on plan -charge 1 | L means (Hy) including 3 9 | B ydraulic ex g getting o 3 m ³ | cavator ut and c | V r)/manual m lisposal of e 9 9 0 @ | Unit eans o xcavat m ³ m ³ Rs | Rate ver areas (exceedi ed earth lead upto 223.41 | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say | No hanical on plan -charge 1 | L means (Hy) including 3 9 | B ydraulic ex g getting o 3 m ³ | cavator ut and c | V r)/manual m lisposal of e 9 9 0 0 0 ding levellir | Unit eans o xcavat m ³ Rs ng up w | Rate ver areas (exceedi ed earth lead upto 223.41 | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say Random rubble masonry in hard s | No hanical on plan -charge 1 | L means (Hy) including 3 foundatio | B ydraulic ex g getting o 3 m ³ n and plint | cavator ut and c | V r)/manual m lisposal of e 9 9 0 @ | Unit eans o xcavat m ³ Rs ng up w | Rate ver areas (exceedi ed earth lead upto 223.41 | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say Random rubble masonry in hard s | No hanical on plan -charge 1 stone in :6 | L means (Hy) including 3 foundatio | B ydraulic ex g getting o 3 m ³ n and plint | cavator ut and c 1 h inclue | V r)/manual m lisposal of e 9 9 0 0 0 ding levellir | Unit eans o excavat m ³ m ³ Rs ng up w m3 | Rate ver areas (exceedi ed earth lead upto 223.41 | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 |
| m No | Item Code | Total-Secondary Clarifier with SUMP-circular Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say Random rubble masonry in hard splinth level with cement mortar 1 | No hanical on plan -charge 1 stone in :6 | L means (Hy) including 3 foundatio | B ydraulic ex g getting o 3 m ³ n and plint 3 | cavator ut and c 1 h inclue | V r)/manual m disposal of e 9 9 0 0 0 ding levellir 112.9 112.9 | Unit eans o excavat m ³ m ³ Rs ng up w m3 | Rate ver areas (exceedi ed earth lead upto 223.41 | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 ete 1:6:12 up to |
| 1 | Item Code | Total-Secondary Clarifier with Summer Clarifier with Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say Random rubble masonry in hard s plinth level with cement mortar 1 Total Say Providing and laying in position | No hanical on plan -charge 1 stone in :6 1 cement | L means (H) including 3 foundatio 3 112.9 t concrete | B ydraulic ex g getting o 3 m ³ n and plint 3 m3 of specific | h inclue 0.45 | V r)/manual m disposal of e 9 9 0 0 0 0 0 0 0 0 0 112.9 112.9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Unit eans or excavat m ³ m ³ Rs m3 m3 Rs s the co | Rate ver areas (exceedi ed earth lead upto 223.41 rith cement concre 7520.41 ost of centering an | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 2010.6 |
| m No | Item Code 2.6.1 | Total-Secondary Clarifier with Summer S | No hanical on plan -charge 1 stone in :6 1 cement | L means (Hy) including 3 foundatio 3 112.9 t concrete : 3 coarse | B ydraulic ex g getting o 3 m ³ n and plint 3 m3 of specific sand (zon | cavator ut and c 1 h includ 0.45 ed grad e-III): 6 | V r)/manual m lisposal of e 9 9 0 0 0 0 0 0 0 112.9 112.9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Unit eans or excavat m ³ m ³ Rs m3 m3 Rs m3 Rs s the cone aggr | Rate ver areas (exceedi ed earth lead upto 223.41 rith cement concre 7520.41 ost of centering an | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 2010.5 |
| 1 | Item Code 2.6.1 | Total-Secondary Clarifier with Summer Clarifier with Description Earth work in excavation by mec 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in For sludge sump Total Say Random rubble masonry in hard s plinth level with cement mortar 1 Total Say Providing and laying in position | No hanical on plan -charge 1 stone in :6 1 cement | L means (H) including 3 foundatio 3 112.9 t concrete | B ydraulic ex g getting o 3 m ³ n and plint 3 m3 of specific sand (zon | h inclue 0.45 | V r)/manual m disposal of e 9 9 0 0 0 0 0 0 0 0 0 112.9 112.9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Unit eans o eans o excavat m ³ Rs ng up w m3 m3 Rs m3 Rs s the co ne aggr m ³ | Rate ver areas (exceedi ed earth lead upto 223.41 rith cement concre 7520.41 ost of centering an | 1745781.56 Amount ng 30 cm in depth, 50 m and lift upto 2010.65 2010.5 |

| | | | | | - | | - | Providing and laying in positio Resistant Cement (SRC) cor |
|--|---|---|--|---|---|---|---|--|
| | | | | | | | | transported to site of work in tr |
| | | | | | | | | of specified grade for reinforce |
| | | | | | | | | excluding the cost of centering |
| | | | | | | | | 7.1 proportions as per IS : 9103 to |
| em is @ 330 | onsidered in this | | | | | | | durability as per direction of |
| | | | | | | | s per desig | 4.1 kg/ ³ .Excess/less cement used as |
| | | | 2.44 | 0.3 | 2.85 | 2.85 | 1 | Base slab |
| | | m' | 4.24 | 2.7 | 0.25 | 6.28 | 1 | Tank walls |
| | | | 0.38 | 0.1 | 0.45 | 8.48 | 1 | Walkway |
| | | m ³ | 7.06 | | | | | Total |
| 73429.31 | 10404.79 | Rs | a | | m ³ | 7.06 | | Say |
| | | | | | | | | 2.6 |
| 1 position and | | | | | | | | D1 Epoxy coated steel reinforcem |
| | 1 | | | | | ermo-Mec | h level. Th | binding all complete upto plinth |
| | 846.87 | kg/m' | 120 | m | 7.06 | | 1 | Quantity as per item No.3 |
| | 846.87 | | | | | | | Total |
| 88844.62 | 104.91 | Rs | a | | kg | 846.871 | | Say |
| cement as pe | doses by weight | vork in | t concrete w | cemen | naterial in | proofing n | ng water p | Extra for providing and mixing manufacturer's specification. |
| | 2399.47 | kg/m ³ | 340 | m ³ | 7.06 | | 1 | Quantity as per item No.3 |
| | 2399.47 | | | | | | | Total |
| 3395.97 | 70.77 | Rs | a | | bags | 47.99 | | Say |
| ings, bases o | r :Foundations, | form fo | emoval of f | and r | pping etc. | tting, pro | | Centering and shuttering inclu columns, etc. for mass concrete |
| | | m ² | 3.42 | 0.3 | | 2.85 | 4 | Bottom slab |
| | | 2 | | | | | | Total |
| | | m | 3.42 | | | | | Say |
| 1197.01 | 350.00 | m Rs | | | m ² | 3.42 | | Say |
| | | Rs | @ | and r | | 3.42 | uding stru | |
| | | Rs | @ | and re | pping etc. | tting, pro | | Centering and shuttering inclu |
| | | Rs `orm fc | @ emoval of f | and re 2.7 | pping etc. | tting, proj string cou | | Centering and shuttering inclu |
| | | Rs form form form | @ emoval of f 19.08 | 2.7 | pping etc. | tting, pro string cou 7.07 | plinth and 1 | Centering and shuttering inclu 2 attached pilasters, butteresses, p For walls outside |
| | | Rs form form form | @ emoval of f 19.08 14.8 | 2.7 2.7 | pping etc. | tting, proj string cou 7.07 5.50 | plinth and | Centering and shuttering inclu attached pilasters, butteresses, p For walls outside For walls inside |
| | | Rs form form for m ² m ² | (a) emoval of f 19.08 14.8 4.2 | 2.7 | pping etc. | tting, pro string cou 7.07 | plinth and 1 | Centering and shuttering inclu attached pilasters, butteresses, p For walls outside For walls inside Walkway |
| | | Rs form form form | @ emoval of f 19.08 | 2.7 2.7 | pping etc. | tting, pro string cou 7.07 | plinth and 1 | Centering and shuttering inclu 2 attached pilasters, butteresses, p For walls outside |
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| 28560.7 tt to the RCC reatment plan slurry : 2 part s and applyin equirements a d with contro slurry shall b er specificatio | r :Walls (any the r :Walls (any the 748.62 terproofing treated or, sewage & wate s integral crystall: or horizontal surf erial shall meet th than 90% comp side. The crystall: out all complete a | Rs form fc m ² m ² Rs for wa reserv (5 part water) : the mat 7 more gative : arried c carry g | (a) emoval of f 19.08 14.8 4.2 38.15 (a) in nature os, podiums, ttio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on neg ck shall be c nance shall | 2.7 2.7 0.5 ophilic pof slab n the ra ine slu netic fil ity of tic pre 'he won perform | y of hydr m ² y of hydr er tanks, ro y mixing ir ral crystall lp of synth permeabil r hydrosta 0.50mm. T product p er sqm | tting, proj string cou 7.07 5.50 8.48 38.15 Illine slurr ment, wat repared by parts integ with the he reducing to 16 ba width of arge. The 0.70 kg p | plinth and 1 1 1 1 1 1 1 1 1 1 1 1 1 | Centering and shuttering inclu attached pilasters, butteresses, p For walls outside For walls inside Walkway Total Say Providing and applying integr structures like retaining walls of tunnels / subway and bridge de water) for vertical surfaces and the same from negative (interna specified in ACI 212-3R-2010 concrete as per DIN 1048 and capable of self-healing of crack and the direction of the engin 23.1 leakage. For vertical surface two |
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| 12 100.36 Filli (ave 5 H 12 100.36 corr tota Say 13 10.26.3 Prov stain 50n Out vert Hot | and the bend test and chemical ermanent identification mark to 0x20x15 cm cement concrete b ominal size) Complete as per de | be visib lock 1:3: | le even af | ter fixing i | ncludin | ng fixing in i | nanhol | es with | |
| 12 100.36 Filli (ave 12 100.36 com 12 100.36 com 13 10.26.3 Provision 10 50m out 10 0.000 vert 10 Hon fillion | | 3 | | | | 3 | No. | | |
| (ave 5 H 12 100.36 corr 12 100.36 corr 13 10.26.3 Say 13 10.26.3 Prov stain 10 0 tota 50m Out vert Hon | | | | No. | |) | Rs | 568.88 | 1706.64 |
| I Say 13 10.26.3 Prov stain 50m Out vert Hon | illing water with 5000 litre tank (verage) to the reservoir site and HP diesel engine pump set , his pomplete. | d pumpir | ng the wate | er into the tools and o | reservo other ap | oir of height opliences an | not less d cost o | s than 3 m using | |
| I Say 13 10.26.3 Prov stain 50m Out vert Hon | | 1 | 2.40 | | 1.5 | 3.61 | m3 | | |
| 13 10.26.3 Prov stain 50m Out vert Hou | | | | | | 3.61 | | | |
| 13 10.26.3 stain 50m Out vert Hor | | | | Kilo litre | |) | Rs | 218.95 | 789.54 |
| Out vert Hor | roviding and fixing hand rail of aircase railing and similar work 0mm dia G.I5.17kg/m , 32mr | ks, incluc | ting apply | ing primin | | | | | |
| | uter total 8.48m/1m c/c | 9 | | | 0.75 | 5.17 | kg | 34.90 | |
| Sav | ertical 50mm dia | 3 | 8.48 | | | 3.17 | • | 80.64 | |
| | Iorizontal 0.25m c/c-32mm dia | | 115.542 | | anda |) | Rs | 194.18 | 22435.91 |
| 11 10.10.0 | Iorizontal 0.25m c/c-32mm dia ay | | - | - | | | | | |
| | Iorizontal 0.25m c/c-32mm dia ay inishing with Deluxe Multi surf | - | 0.75 | | 0.05 | 0.3375 | | | |
| | Iorizontal 0.25m c/c-32mm dia ay inishing with Deluxe Multi surf ertical pipe | 9 | | | 0.03 | 0.81 | | | |
| Say | Iorizontal 0.25m c/c-32mm dia ay inishing with Deluxe Multi surf ertical pipe orizontal pipe | - | 8.48 | | | ý | Rs lied as | 154.62 | 178.06 |
| | Iorizontal 0.25m c/c-32mm dia ay inishing with Deluxe Multi surf ertical pipe orizontal pipe ay | 9 | 1.15 | | a nrona | rad and and | DED NG | nor | |
| Bas Say | Iorizontal 0.25m c/c-32mm dia ay inishing with Deluxe Multi surf ertical pipe orizontal pipe | 9 | 1.15 | all location | s prepa | red and app | | per 17.24 | |

| | | Total-Sludge Sump | | | | | | | | |
|---------|--|---|--|--|--|---|---|--|---|---|
| SLU | J DGE | THICKENER-circular | | _ | | - | - | | | |
| Ite | | | | | | | | | | |
| m N. | T4 | | | | | | | | | |
| NO | Item Code | Description | No | т | в | н | V | II:+ | Data | Amount |
| | Cout | Earth work in excavation by me | No | L means (Hy | | | v r)/manual m | Unit eans or | | Amount |
| | | 1.5 m in width as well as 10 squ | | | | | | | | |
| | | 1.5 m, as directed by Engineer- | | | 50 | | - F | | · · · · · · · · · · · · · · · · · · · | · · · · · · · · · · · · · · · · · · · |
| 1 | 2.6.1 | | - | 1 | 1 | 1 | | 2 | 1 | |
| | | For sludge thickener | 1 | 5.45 | 5.45 | 1 | 29.7 | | | |
| | | Total | | | | | 29.7 | | 223.41 | 6635.1 |
| | | Random rubble masonry in har | d stone in | foundatio | n and plin | th inclu | ding levellin | g up w | rith cement concre | ete 1:6:12 up to |
| | | plinth level with cement mortar | 1:6 | | | | | | | |
| | | | 1 | 5.45 | 5.45 | 0.45 | 112.9 | m3 | | |
| | | Total | | | | | 112.9 | m3 | | |
| | | Say | | 112.9 | m3 | | (a) | Rs | 7520.41 | 849054.1 |
| | | | | | | | 0 | | | |
| | | Providing and laying in position | | | | | | | | |
| 2 | 4.1.6 | work up to plinth level : 1:3:6 (| 1 Cement | I | 1 | r | - | | egate 40 mm non | ninal size) |
| | | For sludge thickener | 1 | 5.4 | 5.4 | 0.15 | 4.37 | | | |
| | | Total | | | | | 4.37 | m ³ | | |
| | | Say | | 4.37 | m ³ | | a | Rs | 7527.06 | 32893.2 |
| | 5.37.1 + | Resistant Cement (SRC) contransported to site of work in the of specified grade for reinforce excluding the cost of centerin proportions as per IS : 9103 to durability as per direction of | cansit mix ed cement g, shutter accelerat | er for all l concrete ring finish te/ retard s | ved design eads, havin work, inclu- ing and re- setting of e | n mix, ng cont uding p einforce concret | inuous agita umping of F ement, inclu e, improve v | ed in t ted mit R.M.C. ding c workab | fully automatic le xer, manufactured from transit mixe ost of admixture ility without imp | d as per mix designer to site of laying as in recommender airing strength and |
| 3 | | transported to site of work in the of specified grade for reinforce excluding the cost of centerin proportions as per IS : 9103 to | ransit mix ed cement g, shutter accelerat f the Eng | er for all l concrete ring finish te/ retard s gineer-in-c | ved design eads, havin work, inclu- ing and re- setting of or wharge. (N | n mix, ng cont uding p einforce concrete ote :- | manufactur inuous agita umping of F ement, inclu e, improve v Cement cost le separately | ed in t ted mit R.M.C. ding c workab ntent c y). | fully automatic le xer, manufactured from transit mixe ost of admixture ility without imp | d as per mix desig er to site of laying es in recommende airing strength an |
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| 3 | + | transported to site of work in the of specified grade for reinforce excluding the cost of centerin proportions as per IS : 9103 to durability as per direction of kg/ ³ .Excess/less cement used as | ransit mix ed cement g, shutter accelerat f the Eng | er for all 1 concrete ring finish te/ retard s gineer-in-c gn mix is p | ved design eads, havi work, inclu- ing and re- setting of e- sharge. (N- payable/rec- | n mix, ng cont uding p einforce concrete ote :- | manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 10.21 10.36 | ed in the ted mines and ted mines and the ted mines and te | fully automatic le xer, manufactured from transit mixe ost of admixture ility without imp | d as per mix designer to site of laying as in recommender airing strength and |
| 3 | + | transported to site of work in the of specified grade for reinforce excluding the cost of centerin proportions as per IS : 9103 to durability as per direction of kg/ ³ .Excess/less cement used as Base slab | ransit mix ed cement g, shutter accelerat f the Eng | er for all 1 concrete ing finish te/ retard s gineer-in-c gn mix is p 5.4 13.82 | ved design eads, havi work, inclu- ing and re- setting of e- harge. (N payable/rec 5.4 0.3 | n mix, ng cont uding p einforce concrete ote :- coverab 0.35 | manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 10.21 | ed in the ted mines and ted mines and the ted mines and te | fully automatic le xer, manufactured from transit mixe ost of admixture ility without imp | d as per mix designer to site of laying as in recommender airing strength and |
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| 3 | + 5.34.1 | transported to site of work in tr of specified grade for reinforce excluding the cost of centerin proportions as per IS : 9103 to durability as per direction of kg/ ³ .Excess/less cement used as Base slab Tank walls Total Say | ransit mix ed cement g, shutter accelerat f the Eng s per desig | er for all l concrete ing finish te/ retard s gineer-in-c gn mix is p 5.4 13.82 20.57 | ved design eads, havi work, inclu- ing and re- setting of d sharge. (No bayable/rec 5.4 0.3 m ³ | n mix, ng cont uding p einforce concrete ote :- coverab 0.35 2.5 | manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 10.21 10.36 20.57 @ | ed in ted mit ted mit c.M.C. ding c vorkab ntent c v). m ³ m ³ m ³ Rs | fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp considered in the 10404.79 | d as per mix desig er to site of laying is in recommender airing strength and is item is @ 330 214005.75 |
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| | 32.2 m ² |
|--|--|
| | 59.08 m ² |
| 69.08 m ² | @ Rs 748.62 5171 |
| ent, water tanks, roof slabs, podiu pared by mixing in the ratio of 5 rts integral crystalline slurry : 1 p h the help of synthetic fiber brus educing permeability of concret o 16 bar hydrostatic pressure or vidth of 0.50mm. The work shall ge. The product performance sl | ture for waterproofing treatment to the I iums, reservior, sewage & water treatment p 5:2 (5 parts integral crystalline slurry : 2 p part water) for horizontal surfaces and appl ush. The material shall meet the requirement et by more than 90% compared with con on negative side. The crystalline slurry shal l be carried out all complete as per specificar shall carry guarantee for 10 years against |
| 0.70 kg per sqm 12.87 2.5 32 | 32.19 m ² |
| | 32.19 m ² |
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| 32.19 III | @ Rs 595.28 1915 |
| educing permeability of concret o 16 bar hydrostatic pressure or vidth of 0.50mm. The work shall ge. The product performance sh 1.10 kg per sqm. | ish. The material shall meet the requirement ete by more than 90% compared with cor- on negative side. The crystalline slurry shall l be carried out all complete as per specifica- shall carry guarantee for 10 years against 13.20 m ² |
| | 13.20 m ² |
| 13.20 m ² | |
| | @ Rs 458.77 605 |
| ing coat of neat cement :1:3 (1 ce | |
| 12.87 2.5 32 | 32.19 m ² |
| | 41.32 |
| | 12.20 m^2 |
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| 13.20 13 80 | 13.20 m ² 36.71 m ² (a) Rs 418.79 3631 |
| 13.20 13 | 36.71 m ² @ Rs 418.79 3631. capsulated as per IS: 10910 tion as 23 mm x 25 mm and mm space between besides necessary and rawing and suitable to with ving manufactures and in manholes with average of the second se |
| 13.20 13 86.71 m ² minimum 6 mm thick plastic enca 786, having minimum cross section h as 165 mm with minimum 112 m urface by ribbing or chequering be th on 138 mm as per standard dra test as per specifications and have even after fixing including fixing | 36.71 m ² @ Rs 418.79 3631. capsulated as per IS: 10910 tion as 23 mm x 25 mm and mm space between besides necessary and rawing and suitable to with ving manufactures and in manholes with average of the second se |
| 13.20 11 86.71 m ² minimum 6 mm thick plastic ence 786, having minimum cross secti h as 165 mm with minimum 112 n rrface by ribbing or chequering be th on 138 mm as per standard dra test as per specifications and have even after fixing including fixing (1cement: 3 coarse sand: 6 grade 4 | 36.71 m ² @ Rs 418.79 3631: capsulated as per IS: 10910 cion as 23 mm x 25 mm and mm space between besides necessary and rawing and suitable to with ving manufactures ng in manholes with led stone aggregate 20 mm 4 No. @ Rs 568.88 227 |
| 13.20 11 86.71 m ² minimum 6 mm thick plastic ence 786, having minimum cross secti h as 165 mm with minimum 112 r rrface by ribbing or chequering be th on 138 mm as per standard dra test as per specifications and hav even after fixing including fixing (1cement: 3 coarse sand: 6 grade | 36.71 m ² @ Rs 418.79 3631. capsulated as per IS: 10910 tion as 23 mm x 25 mm and mm space between besides necessary and rawing and suitable to with ving manufactures ng in manholes with led stone aggregate 20 mm 4 No. @ Rs 568.88 227 n a distance of 5 km eight not less than 3 m using |
| 13.20 11 86.71 m ² minimum 6 mm thick plastic ence 786, having minimum cross section h as 165 mm with minimum 112 n urface by ribbing or chequering be th on 138 mm as per standard dratest as per specifications and have even after fixing including fixing (1cement: 3 coarse sand: 6 grade 4 No. n lorry and conveying water from the water into the reservoir of he er lorry, tools and other applience | 36.71 m ² @ Rs 418.79 3631. capsulated as per IS: 10910 tion as 23 mm x 25 mm and mm space between besides necessary and rawing and suitable to with ving manufactures ng in manholes with led stone aggregate 20 mm 4 No. @ Rs 568.88 227 n a distance of 5 km eight not less than 3 m using |
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| 13.20 11 86.71 m ² minimum 6 mm thick plastic ence 1786, having minimum cross secti h as 165 mm with minimum 112 r race by ribbing or chequering be th on 138 mm as per standard dra test as per specifications and have even after fixing including fixing (1cement: 3 coarse sand: 6 grade 4 No. n lorry and conveying water from the water into the reservoir of he er lorry, tools and other applience 13.85 2 | 36.71 m ² @ Rs 418.79 3631. capsulated as per IS: 10910 tion as 23 mm x 25 mm and mm space between besides necessary and rawing and suitable to with ving manufactures agin manholes with led stone aggregate 20 mm a 4 No. a @ Rs 568.88 227 n a distance of 5 km eight not less than 3 m using es and cost of water etc. a 27.69 m3 a (a) Rs 218.95 606 |

| | | 50mm dia G.I5.17kg/m , 32mm | n dia GI- | -3.17kg/m | | | | | | |
|----|--|---|---|--|--|---|--|--|---|--|
| | | Outer total 8.48m/1m c/c | | _ | | | | | | |
| | | vertical 50mm dia | 9 | | | 0.75 | 5.17 | kg | 34.90 | |
| | | Horizontal 0.25m c/c-32mm dia | 3 | 8.48 | | | 3.17 | kø | 80.64 | |
| | | Say | 5 | 115.542 | | | | Rs | 194.18 | 22435.91 |
| | | Finishing with Deluxe Multi surfa | ace pain | | 6 | s and ex |) | | | 2210019 |
| 14 | 13.48.3 | manufacturers specifications: | 1 | 5 | | | | 01 | Ĩ | |
| | | vertical pipe | 9 | 0.75 | | 0.05 | 0.3375 | m2 | | |
| | | Horizontal pipe | 3 | 8.48 | | 0.03 | 0.81 | m2 | | |
| | | Say | | 1.15 | m2 | | (a) | Rs | 154.62 | 178.0 |
| 15 | 13.52.2 | | | | | | | | | |
| | | Base slab & inside walls | 1 | 45.39 | | | 0 | | 45.39 | |
| | | Say | | 45.3876 | m2 | | a | Rs | 232.68 | 10560.57 |
| | | | | | | | | | | |
| TT | | Total- Sludge Thickener | | | | | | | | 1528822.0 |
| | Item | E CONTACT TANK-rectangul | | | | | | | | |
| | Code | Description | No | L | В | н | v | Unit | Rate | Amount |
| | | Earth work in excavation by mec | | | | | | | | |
| | | 1.5 m, as directed by Engineer-in | -charge | | | | | | | |
| 1 | 2.6.1 | For chlorine contact tank | 1 | 5.4 | 5.4 | 2.65 | 77.27 | m ³ | | |
| 1 | 2.6.1 | For chlorine contact tank Total | 1 | 5.4 | 5.4 | 2.65 | | m ³ m ³ | | |
| 1 | 2.6.1 | | 1 | 5.4 77.27 | | 2.65 | 77.27 | | 223.41 | 17262.5 |
| | 4.1.6 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total | | 77.27 concrete : 3 coarse 5.4 | m ³ of specifi sand (zon 5.4 | ed grad e-III): 6 | 77.27 @ le excluding 5 graded stor | m ³ Rs the cone aggr m ³ | ost of centering a | nd shuttering - A |
| | | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say | Cement 1 | 77.27 concrete : 3 coarse 5.4 4.37 | m ³ of specifi sand (zon 5.4 m ³ | ed grac e-III): (0.15 | 77.27 @ de excluding 5 graded stor 4.37 4.37 @ | m ³ Rs the cone aggr m ³ m ³ Rs | ost of centering a egate 40 mm nom 7527.06 | nd shuttering - A ainal size) 32893.24 |
| 2 | 4.1.6 5.37.1 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of | Cement 1 ready n ent as p usit mixe cement shutter shutter ccelerat the Eng | 77.27 concrete : 3 coarse 5.4 4.37 nixed M-3 per approver for all l concrete v ing finish re/ retard s gineer-in-co | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved design eads, havi work, incluing and re- setting of of harge. (N | ed grad e-III): 6 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 | 77.27 @ be excluding 5 graded stor 4.37 4.37 6 graded stor anufactur inuous agita umping of F ement, inclu e, improve v Cement co | m ³ Rs the cone aggr m ³ m ³ Rs red cer ed in ted mi R.M.C. ding c workab | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp | nd shuttering - A inal size) 32893.2 rk, using Sulphat patching plant an l as per mix desig er to site of laying s in recommende airing strength an |
| 2 | 4.1.6 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p | Cement 1 ready n ent as p usit mixe cement shutter shutter ccelerat the Eng | 77.27 concrete : 3 coarse 5.4 4.37 hixed M-3 ber appro- er for all 1 concrete v ing finish ce/ retard s gineer-in-c gn mix is p | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved design eads, havi work, inclu- ing and re- setting of c harge. (N ayable/rec | ed grac e-III): 6 0.15 0.15 0 ncrete n mix, ng cont uding p einforce concret ote :- coverab | 77.27 @ de excluding 5 graded stor 6 graded stor 4.37 4.37 0 for reinforc manufactur- inuous agita umping of F ement, inclu e, improve v Cement co le separately | m ³ Rs the cone aggr m ³ m ³ Rs Rs ced cer ed in ted mi C.M.C. ding c workab ntent o (). | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp | nd shuttering - A inal size) 32893.2 rk, using Sulphat patching plant an l as per mix desig er to site of laying s in recommende airing strength an |
| 2 | 4.1.6 5.37.1 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab | Cement 1 ready n ent as p sit mixe cement shutter ccelerat the Eng per desig | 77.27 concrete : 3 coarse 5.4 4.37 nixed M-3 per approver for all 1 concrete v ing finish re/ retard s gineer-in-c gn mix is p 5.4 | m ³ of specifi sand (zon 5.4 m ³ o grade c ved design eads, havi work, inclu- ing and ra- setting of o harge. (N ayable/rec 5.4 | ed grad e-III): 6 0.15 oncrete n mix, ng cont uding p einforce concret ote :- :overab 0.3 | 77.27 @ b graded stor 6 graded stor 4.37 4.37 @ for reinforce manufacture inuous agita umping of F ement, inclue e, improve v Cement cool le separately 8.75 | m ³ Rs the cone aggr m ³ m ³ Rs ced cer ed in ted mi R.M.C. ding c workab ntent o). m ³ | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp | nd shuttering - A inal size) 32893.2 rk, using Sulphat patching plant an l as per mix desig er to site of laying s in recommende airing strength an |
| 2 | 4.1.6 5.37.1 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in trai of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab Tank walls | Cement 1 ready n ent as p nsit mixe cement shutter iccelerat the Eng ber desig 1 4 | 77.27 concrete : 3 coarse 5.4 4.37 nixed M-3 per approver for all 1 concrete v ing finish e/ retard s gineer-in-c g mix is p 5.4 4.55 | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved design eads, havi work, inch ing and re setting of c harge. (N ayable/rec 5.4 0.25 | ed grad e-III): 6 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 | 77.27 @ be excluding 5 graded stor 4.37 4.37 6 for reinford manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 8.75 11.38 | m ³ Rs the cone aggr m ³ m ³ Rs ced cer ed in ted mi R.M.C. ding c workab ntent o). m ³ | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp | nd shuttering - A inal size) 32893.2 rk, using Sulphat patching plant an l as per mix desig er to site of laying s in recommende airing strength an |
| 2 | 4.1.6 5.37.1 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in trai of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab Tank walls Walkway | Cement 1 ready n ent as p sit mixe cement shutter ccelerat the Eng per desig | 77.27 concrete : 3 coarse 5.4 4.37 nixed M-3 per approver for all 1 concrete v ing finish re/ retard s gineer-in-c gn mix is p 5.4 | m ³ of specifi sand (zon 5.4 m ³ o grade c ved design eads, havi work, inclu- ing and ra- setting of o harge. (N ayable/rec 5.4 | ed grad e-III): 6 0.15 oncrete n mix, ng cont uding p einforce concret ote :- :overab 0.3 | 77.27 @ be excluding 5 graded stor 4.37 4.37 6 for reinford manufactur inuous agita umping of F ement, inclu e, improve v Cement co le separately 8.75 11.38 0.90 | m ³ Rs the conce aggr m ³ Rs Rs ced cer ed in ted mi C.M.C. ding c workab ntent o '). m ³ m ³ | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp | nd shuttering - A inal size) 32893.2 rk, using Sulphat patching plant an l as per mix desig er to site of laying s in recommende airing strength an |
| 2 | 4.1.6 5.37.1 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab Tank walls Walkway Total | Cement 1 ready n ent as p nsit mixe cement shutter iccelerat the Eng ber desig 1 4 | 77.27 concrete : 3 coarse 5.4 4.37 hixed M-3 ber approver for all 1 concrete wing finish se/ retard s gineer-in-c gn mix is p 5.4 4.55 5.00 | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved design eads, havi work, inclu- ing and ra- setting of 6 harge. (N ayable/rec 5.4 0.25 0.45 | ed grad e-III): 6 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 | 77.27@bcgraded stor6graded stor4.374.37@for reinfordmanufacturinuous agitaumping of Fement, inclue, improve vCement cole separately8.7511.380.9020.12 | m ³ Rs the cone aggr m ³ m ³ Rs ced cer ed in ted mi R.M.C. ding c workab ntent o). m ³ m ³ m ³ | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp considered in thi | nd shuttering - A and size) 32893.2 rk, using Sulphat batching plant and as per mix desig er to site of laying s in recommende airing strength an s item is @ 33 |
| 2 | 4.1.6 5.37.1 + 5.34.1 5.22.6 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in trai of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab Tank walls Walkway | Cement 1 ready n ent as p nsit mix cement shutter shutter ccelerat the Eng 1 4 4 4 | 77.27 concrete : 3 coarse 5.4 4.37 hixed M-3 ber approver for all 1 concrete v ing finish ize/ retard s gineer-in-c gn mix is p 5.4 4.55 5.00 20.12 | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved design eads, havi work, inclu- ing and re- setting of 6 harge. (N ayable/rec 5.4 0.25 0.45 m ³ | ed grac e-III): 6 0.15 0 ncrete n mix, ng cont uding p einforce concret inforce concret ote :- coverab 0.3 2.5 0.1 | 77.27 @ b graded stor 6 graded stor 4.37 4.37 @ for reinforce manufacture inuous agita umping of F ement, inclu e, improve v Cement co le separately 8.75 11.38 0.90 20.12 @ | m ³ Rs the cone aggr m ³ m ³ Rs ced cer ed in ted mi Rs.M.C. ding c workab ntent o). m ³ m ³ Rs m ³ Rs | ost of centering a regate 40 mm nom 7527.06 nent concrete wor fully automatic to xer, manufactured from transit mixe ost of admixture illity without imp considered in thi 10404.79 | nd shuttering - A and size) 32893.24 as per mix designer to site of laying s in recommender airing strength and s item is @ 330 209375.55 |
| 3 | 4.1.6 5.37.1 + 5.34.1 5.22.6 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in trai of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab Tank walls Walkway Total Say | Cement 1 ready n ent as p nsit mixe cement shutter ccelerat the Eng 1 4 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 | 77.27 concrete : 3 coarse 5.4 4.37 hixed M-3 ber approver for all 1 concrete v ing finish ce/ retard s gineer-in-c gn mix is p 5.4 4.55 5.00 20.12 R.C.C. wo | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved desigu eads, havi work, inclu ing and ra- setting of a harge. (N vayable/rec 5.4 0.25 0.45 m ³ | ed grace e-III): 6 0.15 0 ncrete n mix, ng cont uding p einforce concret inforce concret 0.3 2.5 0.1 | 77.27 @ be excluding 5 graded stor 4.37 4.37 @ for reinforce manufacture inuous agita umping of F ement, inclu e, improve v Cement co le separately 8.75 11.38 0.90 20.12 @ aightening, | m ³ Rs the cone aggr m ³ m ³ Rs ced cer ed in ted mi ted mi ted mi ted mi ted mi ted mi ted mi ted mi m ³ m ³ m ³ m ³ m ³ Rs coverable m ³ m ³ Rs ted cer en ted set ted mi ted ter ted ter ter ted ter ter ted ter ted ter ted ter ter ter ter ter ter ter ter ter ter | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp considered in thi 10404.79 | nd shuttering - A and size) 32893.24 rk, using Sulphat batching plant and as per mix desig er to site of laying s in recommende airing strength an s item is @ 33 209375.55 |
| 2 | 4.1.6 5.37.1 + 5.34.1 5.22.6 +OD1 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (14 For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) conte transported to site of work in trans of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab Tank walls Walkway Total Say Epoxy coated steel reinforceme | Cement 1 ready n ent as p nsit mixe cement shutter ccelerat the Eng 1 4 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 | 77.27 concrete : 3 coarse 5.4 4.37 hixed M-3 ber approver for all 1 concrete v ing finish ce/ retard s gineer-in-c gn mix is p 5.4 4.55 5.00 20.12 R.C.C. wo | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved design eads, havi work, inclu ing and ro setting of c harge. (N ayable/rec 5.4 0.25 0.45 m ³ | ed grace e-III): 6 0.15 0 ncrete n mix, ng cont uding p einforce concret inforce concret 0.3 2.5 0.1 | 77.27 @ be excluding 5 graded stor 4.37 4.37 6 for reinforce manufactur- inuous agita umping of F ement, inclu e, improve v Cement cool le separately 8.75 11.38 0.90 20.12 @ aightening, abars of gra | m ³ Rs the cone aggr m ³ m ³ Rs ced cer ed in ted mi ted mi ted mi ted mi ted mi ted mi ted mi ted mi m ³ m ³ m ³ m ³ m ³ Rs coverable m ³ m ³ Rs ted cer en ted set ted mi ted ter ted ter ter ted ter ter ted ter ted ter ted ter ter ter ter ter ter ter ter ter ter | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp considered in thi 10404.79 | nd shuttering - Ai ainal size) 32893.24 rk, using Sulphat batching plant and a sper mix desig er to site of laying s in recommende airing strength and s item is @ 334 209375.55 ng in position and |
| 2 | 4.1.6 5.37.1 + 5.34.1 5.22.6 +OD1 | Total Say Providing and laying in position work up to plinth level : 1:3:6 (1) For chlorine contact tank Total Say Providing and laying in position Resistant Cement (SRC) cont transported to site of work in tran of specified grade for reinforced excluding the cost of centering, proportions as per IS : 9103 to a durability as per direction of kg/ ³ .Excess/less cement used as p Base slab Tank walls Walkway Total Say Epoxy coated steel reinforceme binding all complete upto plinth 1 | Cement 1 ready n ent as p nsit mixe cement shutter ccelerat the Eng 1 4 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 | 77.27 concrete : 3 coarse 5.4 4.37 hixed M-3 ber approver for all 1 concrete v ing finish ce/ retard s gineer-in-c gn mix is p 5.4 4.55 5.00 20.12 R.C.C. wo | m ³ of specifi sand (zon 5.4 m ³ 0 grade c ved desigu eads, havi work, inclu ing and ra- setting of a harge. (N vayable/rec 5.4 0.25 0.45 m ³ | ed grace e-III): 6 0.15 0 ncrete n mix, ng cont uding p einforce concret inforce concret 0.3 2.5 0.1 | 77.27 @ be excluding 5 graded stor 4.37 4.37 6 for reinforce manufactur- inuous agita umping of F ement, inclu e, improve v Cement cool le separately 8.75 11.38 0.90 20.12 @ aightening, abars of gra | m ³ Rs the come aggr m ³ m ³ Rs ced cer ed in ted mi c.M.C. ding c workab ntent of p). m ³ m ³ m ³ Rs m ³ Rs cutting de Fe-2 | ost of centering a egate 40 mm nom 7527.06 nent concrete wor fully automatic b xer, manufactured from transit mixe ost of admixture ility without imp considered in thi 10404.79 t, bending, placin 500D or more. | nd shuttering - Ai inal size) 32893.20 Tk, using Sulphat batching plant and a sper mix desig er to site of laying s in recommended airing strength and s item is @ 330 209375.59 ag in position and kg |

| 5 | 4.12 | Extra for providing and mixing manufacturer's specification. | water p | proofing n | naterial in | cement | t concrete v | vork in | doses by weight | t of cement as per |
|----|---------|--|---|--|---|--|--|--|---|---|
| | | Quantity as per item No.3 | 1 | | 20.12 | m ³ | 340 | kg/m ³ | 6841.82 | kg |
| | | Total | | | | | | | 6841.82 | kg |
| | | Say | | 136.84 | bags | | a | Rs | 70.77 | 9683.23 |
| 6 | 5.9.1 | Centering and shuttering includ columns, etc. for mass concrete | ing stru | tting, pro | pping etc. | and re | emoval of t | form fo | or :Foundations, | footings, bases of |
| | | Bottom slab | 4 | 5.40 | | 0.3 | 6.48 | m ² | | |
| | | Total | | | | | 6.48 | | | |
| | | Say | | 6.48 | m ² | | | Rs | 350.00 | 2268.02 |
| 7 | 5.9.2 | Centering and shuttering includ attached pilasters, butteresses, pli | - | tting, pro | pping etc. | and re | emoval of f | òrm fo | or :Walls (any th | ickness) including |
| | | For walls outside | 4 | 4.80 | | 2.5 | 48.00 | m ² | | |
| | | For walls inside | 4 | 4.30 | | 2.5 | 43.0 | m ² | | |
| | | Walkway | 4 | 5.00 | | 0.55 | 11.0 | m2 | | |
| | | Total | | | | | 102.00 | m ² | | |
| | | Say | | 102.00 | m ² | | | Rs | 748.62 | 76359.54 |
| 8 | 22.23.1 | the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and a capable of self-healing of cracks and the direction of the engine leakage. For vertical surface two | i.e by resistant up to a er-in-cha | reducing to 16 ba width of arge. The | permeabil r hydrosta 0.50mm. T product p | lity of tic pres The wor | concrete by ssure on neg rk shall be c | ative arried | than 90% comp side. The crystall out all complete a | bared with control ine slurry shall be as per specification |
| 0 | | Inside of walls | 4 | 4.30 | er sqiii | 2.5 | 43.00 | m^2 | | |
| | | Total | | 1.5 0 | | 2.0 | 43.00 | | | |
| | | Say | | 43.00 | m^2 | | | Rs | 595.28 | 25596.83 |
| | | Providing and applying integra structures like retaining walls of t tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and n capable of self-healing of cracks and the direction of the engine | the base k etc., p : 1 (3 r) side w i.e by resistant up to a er-in-ch | ment, wat repared b parts integ ith the he reducing to 16 ba width of arge. The | er tanks, ro y mixing in ral crystall lp of syntl permeabil r hydrosta 0.50mm. T product p | oof slab n the ra line slu netic fil lity of tic pres | os, podiums, atio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne rk shall be c | reserv (5 part water) The mat more gative | ior, sewage & wa is integral crystall for horizontal sur terial shall meet than 90% comp side. The crystall out all complete a | ter treatment plant, ine slurry : 2 parts faces and applying he requirements as pared with control ine slurry shall be us per specification |
| 9 | 22.23.2 | 0 | ie coat (| | | | 19.40 | m^2 | | |
| | | Bottom slab inside | 1 | 4.30 | 4.3 | | 18.49 18.49 | | | |
| | | Total | | 18.49 | m^2 | | | m Rs | 458.77 | 8482.65 |
| | | Say | | | | | <u> </u> | | | 8482.05 |
| 10 | 13.7.1 | 12 mm cement plaster finished w | | | of neat cer | | | | e sand) | |
| | | Inside of walls | 4 | 4.30 | | 2.75 | 47.30 | | | |
| | | Outside of walls | 4 | 5.00 | | 2.5 | 50.00 | | | |
| | | Base slab inside | 1 | 4.30 | 4.3 | | 18.49 | m ² | | |
| | | Walkway | 4 | 5.00 | | 1 | 20.00 | | | |
| | | Total | | | | | 135.79 | | | |
| | | Say | | 135.79 | m^2 | | a | Rs | 418.79 | 56867.12 |

| 11 | 19.16 | Providing orange colour safety fo on 12 mm dia steeel bar conformi over all minimum length 263 mm protruded legs having 2 mm tread adequate anchoring projections of stand the bend test and chemical i permanent identification mark to 30x20x15 cm cement concrete ble nominal size) Complete as per de | ing to IS and wid l on top n tail ler resistand be visib ock 1:3: | 1786, ha dth as 165 surface by ngth on 13 ce test as p le even af | ving minin mm with ribbing o 8 mm as p per specific ter fixing i | num cro minimu r chequ er stand cations ncludin | oss section a m 112 mm s ering beside dard drawin and having og fixing in n 6 graded ste | s 23 m space t es nece g and s manufa nanhol one agg | m x 25 mm and between ssary and uitable to with actures es with | |
|---------|---------|---|---|--|---|--|--|--|--|---------------------|
| | | 0 | 4 | | N | | | No. | 5 (0.00 | 2275.52 |
| 12 | 100.36 | Say Filling water with 5000 litre tanko (average) to the reservoir site and 5 HP diesel engine pump set , hire complete. | pumpir | in lorry and the wate | er into the tools and o | reservo | er from a di | not les d cost o | s than 3 m using | 2275.52 |
| | | total | 1 | 4.50 | 4.5 | 2 | 36.98 | mo | | |
| | | Say | | 36.08 | Kilo litre | | | Rs | 218.95 | 8096.66 |
| 12 | 10.26.3 | Providing and fixing hand rail of | annrove | | | c to ste |) | | | 8070.00 |
| 15 | 10.20.3 | 50mm dia G.I5.17kg/m , 32mm | | | | e. to su | | 1111 <u>5</u> , 0 | alcony runnig, | |
| | | Outer total 23.6 m/1m c/c | 01- | 2.17 Kg/111 | | | | | | |
| | | vertical 50mm dia | 24 | | | 0.75 | 5.17 | kg | 93.06 | |
| | | | | | | | | | | |
| | | Horizontal 0.25m c/c-32mm dia | 3 | 23.6 | | | 3.17 | - | 224.44 | |
| | | Say | | 317.496 | | | | Rs . | 194.18 | 61651.11 |
| 14 | 13.48.3 | Finishing with Deluxe Multi surfa manufacturers specifications: | | | | | | | er as per | |
| | | vertical pipe | 24 | 0.75 | | 0.05 | | m2 | | |
| | | Horizontal pipe | 3 | 23.6 | | 0.03 | 2.27 | m2 | | |
| | | Say | | 3.17 | | |) | Rs | 154.62 | 489.47 |
| 15 | 13.52.2 | Finishing with Epoxy paint (two or manufacturer's specifications incl On concrete work | uding a | ppropriate | priming c | | eparation of | | e, etc. complete. | |
| | | Base slab & inside walls | 1 | 65.79 | | | 0 | | 65.79 | |
| | | Say | | 65.79 | m2 | | @ | Rs | 232.68 | 15307.71 |
| | | Total-Chlorine Contact Tank | | | | | | | | 779939.88 |
| | TER F | EED TANK-rectangular | | | | | | | | |
| m No | Item | | | | | | | | | |
| | Code | Description | No | L | В | Н | v | Unit | Rate | Amount |
| 1 | 2.6.1 | Earth work in excavation by mech 1.5 m in width as well as 10 sqm 1.5 m, as directed by Engineer-in- | on plan | | | cavato | | | | |
| - | | For filter feed tank | 1 | 4.6 | 4.6 | 0.5 | 10.58 | m ³ | | |
| | | Total | | | | 0.0 | 10.58 | | | |
| | | Say | | 10.58 | m ³ | | | Rs | 223.41 | 2363.63 |
| 2 | 4.1.6 | Providing and laying in position work up to plinth level : 1:3:6 (1) | | concrete | of specific | | e excluding | the co | ost of centering a | nd shuttering - All |
| | | For filter feed tank | 1 | 4.6 | | 0.15 | 3.17 | | | |
| | | Total | | | | | 3.17 | m ³ | | |
| | | Say | | 3.17 | m ³ | | | Rs | 7527.06 | 23860.78 |

| | Providing and laying in position | ready n | nixed M-3 | 0 grade c | oncrete | for reinford | ed cen | nent concrete wo | rk, us | ing Sulphat |
|--------|---|----------|------------|-------------|----------------|---------------|--------------------|-------------------|---------|--------------|
| | Resistant Cement (SRC) cont | | | | | | | | | |
| | transported to site of work in | | | | | | | | | |
| | of specified grade for reinforced | | | | | | | | | |
| | excluding the cost of centering, proportions as per IS : 9103 to a | | | | | | | | | |
| | durability as per direction of | | | | | | | | | |
| | $kg/^{3}$.Excess/less cement used as p | - | | | | | | | 15 1101 | |
| | Base slab | 1 | 4.6 | | 0.3 | 6.35 | | | | |
| | Raft | 1 | 4.6 | 4.6 | 0.45 | 9.52 | | | | |
| | | | | | | | | | | |
| | Column | 4 | 0.35 | 0.35 | 2 | 0.98 9.38 | 3 | | | |
| | Tank walls | 2 | 7.50 | 0.25 | 2.5 | | m | | | |
| | Walkway | 4 | 4.10 | 0.45 | 0.1 | 0.74 | 3 | | | |
| | Total | | | 3 | | 26.96 | | | | |
| | Say | | 26.96 | m | | a | Rs | 10404.79 | | 280544.3 |
| 5.22.6 | | | | | . , | | | | | • .• |
| | Epoxy coated steel reinforceme binding all complete upto plinth l | | | | | | | | ng in | position ai |
| | | | ermo-wiec | 26.96 | | | kg/m ³ | | 1- ~ | |
| | Quantity as per item No.3 | 1 | | 26.96 | m | 120 | kg/m | 3235.56 | - | |
| | Total | | | | | | | 3235.56 | кg | |
| | Say | | 3235.56 | • | | Ű | Rs | 104.91 | | 339440.1 |
| | Extra for providing and mixing manufacturer's specification. | water p | proofing n | naterial in | cemen | t concrete v | vork in | doses by weigh | t of c | ement as p |
| | | 1 | | 26.96 | m ³ | 240 | lea/m ³ | 01/7 42 | 1 | |
| | Quantity as per item No.3 | 1 | | 26.96 | m | 340 | kg/m ³ | 9167.42 | - | |
| | Total | | | | | | | 9167.42 | kg | |
| | Say | | 183.35 | bags | | a | Rs | 70.77 | | 12974.6 |
| | Centering and shuttering includ columns, etc. for mass concrete | ing stru | tting, pro | pping etc. | and re | emoval of t | form fo | or :Foundations, | footir | ngs, bases o |
| | Bottom slab | 2 | 9.20 | | 0.3 | 5.52 | m^2 | | | |
| | | 2 | | | | 8.55 | 111 | | | |
| | Raft | | 9.50 | | 0.45 | | | | | |
| | Column | 4 | 1.40 | | 2 | 11.2 | 2 | | | |
| _ | Total | | | 2 | | 25.27 | | | | |
| | Say | | 25.27 | m² | | a | Rs | 350.00 | | 8844.5 |
| | Centering and shuttering includ | - | | | and re | emoval of f | `orm fo | or :Walls (any th | ickne | ss) includir |
| | attached pilasters, butteresses, pl | 1 1 | Ũ | ises etc. | 2.5 | 40.00 | 2 | | 1 | |
| | For walls outside | 2 | 8.00 | | 2.5 | 40.00 35.0 | | | | |
| | | | 7 00 | | | | m | | | |
| | For walls inside | 2 | 7.00 | | 2.5 | | | | | |
| | Walkway | 2 | 4.55 | | 2.5 0.55 | 10.0 | | | | |
| | | | | | - | 10.0 85.01 | | | | |

| | 595.28 | Rs | @ | | m ² | 35.00 | | Say | | |
|---|--|--|---|---|---|--|---|--|-----------|----|
| treatment plant, slurry : 2 parts es and applying requirements as ed with control slurry shall be per specification | ior, sewage & wate s integral crystallir for horizontal surfa erial shall meet the than 90% compa side. The crystallir out all complete as | reserve (5 part water) : 'he mat 7 more gative : arried carry g | os, podiums, titio of 5 : 2 rry : 1 part y ber brush. T concrete by ssure on ne rk shall be c nance shall | oof slat n the ra line slu hetic fil lity of ttic pre | er tanks, r mixing i ral crystal lp of synti permeabi r hydrosta 0.50mm. T product p per sqm. | ment, water repared by parts integ ith the he reducing to 16 ba width of 0 arge. The @1.10 kg | the base k etc., p 3 : 1 (3 p) side w i.e by resistant up to a er-in-ch | Providing and applying integra structures like retaining walls of t tunnels / subway and bridge decl water) for vertical surfaces and 3 the same from negative (internal specified in ACI 212-3R-2010 concrete as per DIN 1048 and t capable of self-healing of cracks and the direction of the engine leakage. For horizontal surface of | 22.23.2 | 9 |
| | | | 12.25 12.25 | | 3.50 | 3.50 | 1 | Bottom slab inside | | |
| 5(10.02 | 450 55 | | | | m ² | 10.05 | | Total | | |
| 5619.93 | 458.77 | Rs | a | | m | 12.25 | | Say | | |
| | e sand) | | | ment :1 | of neat ce | ating coat | ith a flo | 12 mm cement plaster finished w | 0 13.7.1 | 10 |
| | | | 35.00 | 2.5 | | 7.00 | 2 | Inside of walls | | |
| | | m ² | 12.25 | | 3.5 | 3.50 | 1 | Base slab inside | | _ |
| | | | 45.92 | 2.8 | | 8.20 | 2 | Outside wall | | |
| | | m ² | 93.17 | | | | | Total | | |
| 39018.41 | 418.79 | Rs | | | m ² | 93.17 | | Say | | |
| | uitable to with actures es with | g and s manufa nanhol | dard drawin and having ng fixing in 1 | oer stand cations includir | 8 mm as p per specific ter fixing i | ngth on 13 se test as p le even af | n tail lei resistand be visib | protruded legs having 2 mm tread adequate anchoring projections o stand the bend test and chemical permanent identification mark to 30x20x15 cm cement concrete bl | 19.16 | 11 |
| | | | 0 | je sund. | | o (Teenie | | nominal size) Complete as per de | | |
| | | No | | | | o (reeme | esign | | | |
| 2275.52 | 568.88 | No. Rs | 4 | | | | | nominal size) Complete as per de | | |
| 2275.52 | s than 3 m using | Rs stance not less | 4 @ er from a di bir of height | ing wat | No. nd convey er into the | 4 in lorry and the wate | ers fited pumpin | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete | 2 100.36 | 12 |
| 2275.52 | of 5 km s than 3 m using | Rs stance not less d cost o | 4 @ er from a di bir of height | ing wat | No. nd convey er into the tools and | 4 in lorry and the wate | ers fited pumpin | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete | 2 100.36 | 12 |
| 2275.52 | of 5 km s than 3 m using | Rs stance not less d cost o | 4 @ ter from a di bir of height opliences an | ing wat | No. nd convey er into the tools and | 4 in lorry a ng the wate ker lorry, | ers fited pumpin | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete | 2 100.36 | 12 |
| 2275.52 | of 5 km s than 3 m using of water etc. 218.95 | Rs stance of not less d cost of m3 Rs | 4 @ ter from a di pri of height ppliences an 25.92 25.92 @ | ing wat reserve other ap | No. nd convey er into the tools and o 3.6 Kilo litre | 4 in lorry as g the wate ker lorry, 3.60 25.92 | ers fited l pumpin e for tan | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say | 2 100.36 | 12 |
| | of 5 km s than 3 m using of water etc. 218.95 alcony railing, | Rs stance of not less d cost of m3 Rs iling, b | 4 @ ter from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra | ing wat reserve other ap 2 tc. to ste | No. nd convey er into the tools and 3.6 Kilo litre welding et ing primin | 4 in lorry and the water ker lorry, 3.60 25.92 ed size by ling apply | ers fited l pumpin e for tan 1 c approve ss, inclue | nominal size) Complete as per de Say Filling water with 5000 litre tanko (average) to the reservoir site and 5 HP diesel engine pump set , hirr complete. total Say Providing and fixing hand rail of staircase railing and similar work | | |
| | of 5 km s than 3 m using of water etc. 218.95 alcony railing, | Rs stance of not less d cost of m3 Rs iling, b | 4 @ ter from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra | ing wat reserve other ap 2 tc. to ste | No. nd convey er into the tools and 3.6 Kilo litre welding et ing primin | 4 in lorry and the water ker lorry, 3.60 25.92 ed size by ling apply | ers fited l pumpin e for tan 1 capprova cs, inclua | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r | | |
| | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. | Rs stance on not less d cost of m3 Rs illing, b steel pr | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves | ing wat reserve other ap | No. nd convey er into the tools and 3.6 Kilo litre welding et ing primin | 4 in lorry and the water ker lorry, 3.60 25.92 ed size by ling apply | ers fited l pumpin e for tar | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r Outer total 20 m/1m c/c vertical | | |
| | of 5 km s than 3 m using of water etc. 218.95 alcony railing, | Rs stance on not less d cost of m3 Rs illing, b steel pr | 4 @ ter from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra | ing wat reserve other ap 2 tc. to ste | No. nd convey er into the tools and 3.6 Kilo litre welding et ing primin | 4 in lorry and the water ker lorry, 3.60 25.92 ed size by ling apply | ers fited l pumpin e for tan 1 capprova cs, inclua | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r | | |
| | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. | Rs stance of not less d cost of m3 Rs iling, b steel pr kg | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves | ing wat reserve other ap | No. nd convey er into the tools and 3.6 Kilo litre welding et ing primin | 4 in lorry and the water ker lorry, 3.60 25.92 ed size by ling apply | ers fited l pumpin e for tar | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r Outer total 20 m/1m c/c vertical | | |
| | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. 77.55 | Rs stance of not less d cost of m3 Rs iling, b steel pr kg | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves 5.17 3.17 | ing wat reserve other ap | No. nd convey er into the tools and o 3.6 Kilo litre welding et ing primin | 4 in lorry as ng the wate ker lorry, 3.60 25.92 ed size by ling apply Gl-3.17kg | ers fited l pumpin e for tan 1 approve s, inclue mm dia 20 | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.l5.17kg/m , 32r Outer total 20 m/1m c/c vertical 50mm dia | | |
| 5675.10 | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. 77.55 190.20 194.18 | Rs stance of not less d cost of m3 Rs illing, b steel pr kg kg Rs | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves 5.17 3.17 @ | ing wat reserve other ap 2 tc. to str ag coat of 0.75 | No. nd convey er into the tools and o 3.6 Kilo litre welding et ing primin | 4 in lorry at ag the wate ker lorry, 3.60 25.92 ed size by ling apply Gl-3.17kg 20 267.75 | 4 ers fited pumpin e for tar fapprove s, inclue mm dia 20 3 | nominal size) Complete as per de Say Filling water with 5000 litre tanko (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r Outer total 20 m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi surfa | | 13 |
| 5675.10 | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. 77.55 190.20 194.18 | Rs stance on not less d cost of m3 Rs illing, b steel pr kg kg Rs g prime | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves 5.17 3.17 @ | ing wat reserve other ap 2 tc. to str ag coat of 0.75 | No. nd convey er into the tools and o 3.6 Kilo litre welding et ing primin | 4 in lorry at ag the wate ker lorry, 3.60 25.92 ed size by ling apply Gl-3.17kg 20 267.75 | 4 ers fited pumpin e for tar fapprove s, inclue mm dia 20 3 | nominal size) Complete as per de Say Filling water with 5000 litre tanko (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r Outer total 20 m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi surfa | 3 10.26.3 | 13 |
| 5675.10 | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. 77.55 190.20 194.18 | Rs stance of not less d cost of m3 Rs illing, b steel pr kg kg Rs g prime m2 | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves 5.17 3.17 @ cteriors usin | ing wat reserve other ap 2 tc. to ste ag coat 0.75 | No. nd convey er into the tools and o 3.6 Kilo litre welding et ing primin | 4 in lorry and ing the wate ker lorry, 3.60 25.92 ed size by ling apply Gl-3.17kg 20 267.75 t system for | ers fited l pumpin e for tan 1 capprove as, inclue mm dia 20 3 cace pain | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r Outer total 20 m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi surfa manufacturers specifications: | 3 10.26.3 | 13 |
| 5675.10 | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. 77.55 190.20 194.18 | Rs stance of not less d cost of m3 Rs illing, b steel pr kg kg Rs g prime m2 | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves 5.17 3.17 @ cteriors usin 0.75 1.92 | ing wat reserve other ap c. to stan g coat 0.75 s and ex 0.05 | No. nd convey er into the tools and o 3.6 Kilo litre welding et ing primin g/m kg pr interiors | 4 in lorry at ag the wate ker lorry, 3.60 25.92 d size by ling apply GI-3.17kg 20 267.75 t system for 0.75 | ers fited l pumpin e for tan approve s, inclue nm dia 20 3 ace pain 20 | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r Outer total 20 m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi surfa manufacturers specifications: vertical pipe | 3 10.26.3 | 13 |
| 5675.10 | of 5 km s than 3 m using of water etc. 218.95 alcony railing, rimer. 777.55 190.20 194.18 er as per 154.62 | Rs stance of not less d cost of m3 Rs illing, b steel pr kg kg kg Rs g prime m2 Rs | 4 @ er from a di pir of height ppliences an 25.92 25.92 @ eel ladder ra of approves 5.17 3.17 @ cteriors usin 0.75 1.92 @ | 2 ing wat reserve other ap 2 c. to study ag coat of 0.75 0.75 0.05 0.03 | No. nd convey er into the tools and o 3.6 Kilo litre welding et ing primin g/m kg pri interiors m2 | 4 in lorry and ag the wate ker lorry, 3.60 25.92 ed size by ling apply GI-3.17kg 20 267.75 t system for 0.75 20 2.67 | ers fited l pumpin e for tan 1 approve ss, inclue 20 3 ace pain 20 3 | nominal size) Complete as per de Say Filling water with 5000 litre tank (average) to the reservoir site and 5 HP diesel engine pump set , hir complete. total Say Providing and fixing hand rail of staircase railing and similar work 50mm dia G.I5.17kg/m , 32r Outer total 20 m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi surfa manufacturers specifications: vertical pipe Horizontal pipe Say | 3 10.26.3 | 13 |

| | | Say | | 47.25 | m2 | | a | Rs | 232.68 | 10993.91 |
|---|------------------------|---|--|---|---|---|---|---|--|--|
| | | Total- Filter Feed Tank | | | | | | | | 868490.43 |
| R | EATEE |) WATER TANK-rectangular | | | | | | | | |
| ı | Code | Description | No | L | В | Н | V | | Rate | Amount |
| | | Earth work in excavation by me | | | | | · | | · · | • • |
| | | 1.5 m in width as well as 10 sqn | - |) including | g getting o | ut and o | disposal of e | xcavat | ed earth lead upto | 50 m and lift upto |
| 1 | 2.6.1 | 1.5 m, as directed by Engineer-in | n-charge | | | | | | | |
| - | | For treated water tank | 1 | 6.6 | 6.6 | 0.75 | 32.67 | m ³ | | |
| | | Total | | 0.0 | 0.0 | 0.70 | 32.67 | | | |
| | | Say | | 32.67 | m ³ | | | Rs | 223.41 | 7298.64 |
| | | | | | | . 1 | 0 | | | |
| 2 | 4.1.6 | Providing and laying in position work up to plinth level : 1:3:6 (1 | | | - | - | - | | - | - |
| 2 | 4.1.0 | For treated water tank | 1 | . 5 coarse 6.6 | 6.6 | 0.15 | 6.53 | | egate 40 min non | lillai size) |
| | | Total | 1 | 0.0 | 0.0 | 0.15 | 6.53 | | | |
| | | Say | | 6.53 | m ³ | | | Rs | 7527.06 | 49151.7 |
| — | | Suy | | 0.55 | 111 | | W | KS | /52/.00 | 49151.7 |
| 3 | 5.37.1 + 5.34.1 | of specified grade for reinforced excluding the cost of centering proportions as per IS : 9103 to durability as per direction of kg/ ³ .Excess/less cement used as | , shutter accelerat the Eng | ing finish e/ retard s gineer-in-c | ing and resetting of charge. (N | einforce concret ote :- | ement, inclu e, improve v Cement co | ding c workab ntent o | ost of admixtures ility without impa | s in recommended |
| 5 | 5.54.1 | Base slab | | | | | 26.14 | | | |
| _ | | | 1 | 6.6 | 6.6 0.25 | 0.6 | 17.25 | | | |
| | | Tank walls | 2 | 11.50 | 0/5 | 1 | 1/23 | 111 | | |
| | | 11 | 4 | 6.00 | | | | | | |
| _ | | walkway | 4 | 6.00 | 0.45 | 0.1 | 1.08 | | | |
| | | Total | 4 | | 0.45 | | 1.08 44.47 | m ³ | 10404.70 | |
| | | - | 4 | 6.00 44.47 | 0.45 | | 1.08 44.47 | | 10404.79 | 462659.4 |
| 4 | | Total | ent for 1 | 44.4 7 R.C.C. wo | 0.45 m ³ ork includ chanically | 0.1 ing stra Treated | 1.08 44.47 @ aightening, | m ³ Rs cutting | , bending, placir | |
| 4 | | Total Say Epoxy coated steel reinforcem | ent for 1 | 44.4 7 R.C.C. wo | 0.45 m ³ | 0.1 ing stra Treated | 1.08 44.47 @ aightening, t bars of gra | m ³ Rs cutting | , bending, placir | ng in position and |
| 4 | | Total Say Epoxy coated steel reinforcem binding all complete upto plinth | ent for 1 | 44.4 7 R.C.C. wo | 0.45 m ³ ork includ chanically | 0.1 ing stra Treated | 1.08 44.47 @ aightening, t bars of gra | m ³ Rs cutting de Fe-4 | , bending, placir 500D or more. | ng in position and |
| 4 | | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 | ent for 1 | 44.4 7 R.C.C. wo | 0.45 m ³ ork includ chanically 44.47 | 0.1 ing stra Treated | 1.08 44.47 @ aightening, d bars of gra 120 | m ³ Rs cutting de Fe-4 | , bending, placir 500D or more. 5335.92 | ng in position and kg kg |
| 4 | | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing | ent for 1 level. Th | 44.47 R.C.C. wo ermo-Mec 5335.92 | 0.45 m ³ ork includ chanically 44.47 kg | 0.1 ing stra Treated m ³ | 1.08 44.47 @ aightening, 1 bars of gra 120 @ | m ³ Rs cutting de Fe-3 kg/m ³ Rs | , bending, placir 500D or more. 5335.92 5335.92 104.91 | ng in position and kg 559787.3' |
| 4 | | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. | ent for 1 level. Th | 44.47 R.C.C. wo ermo-Mec 5335.92 | 0.45 m ³ ork includ chanically 44.47 kg material in | 0.1 ing stra Treatec m ³ cemen | 1.08 44.47 @ aightening, l bars of gra 120 @ t concrete v | m ³ Rs cutting de Fe-: kg/m ³ Rs vork ir | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weight | ng in position and kg 559787.3' t of cement as pe |
| _ | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing | ent for 1 level. Th | 44.47 R.C.C. wo ermo-Mec 5335.92 | 0.45 m ³ ork includ chanically 44.47 kg | 0.1 ing stra Treatec m ³ cemen | 1.08 44.47 @ aightening, l bars of gra 120 @ t concrete v | m ³ Rs cutting de Fe-3 kg/m ³ Rs | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weigh 15118.44 | kg kg 559787.3' t of cement as pe |
| _ | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. | ent for l level. Th 1 | 44.47 R.C.C. wo ermo-Mec 5335.92 | 0.45 m ³ ork includ chanically 44.47 kg material in | 0.1 ing stra Treatec m ³ cemen | 1.08 44.47 @ aightening, d bars of gra 120 @ t concrete v 340 | m ³ Rs cutting de Fe-: kg/m ³ Rs vork ir kg/m ³ | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weight 15118.44 15118.44 | kg kg 559787.3' t of cement as pe |
| | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 | ent for l level. Th 1 | 44.47 R.C.C. wo ermo-Mec 5335.92 | 0.45 m ³ ork includ chanically 44.47 kg naterial in 44.47 | 0.1 ing stra Treatec m ³ cemen | 1.08 44.47 @ aightening, d bars of gra 120 @ t concrete v 340 | m ³ Rs cutting de Fe-: kg/m ³ Rs vork ir | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weigh 15118.44 | kg kg 559787.3 ' t of cement as pe |
| 5 | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total | ent for 1 level. Th 1 g water p | 44.47 R.C.C. wo ermo-Mec 5335.92 proofing n 302.37 | 0.45 m ³ ork includ chanically 44.47 kg naterial in 44.47 bags | 0.1 ing stra Treatec m ³ cemen m ³ | 1.08 44.47 @ aightening, d bars of gra 120 @ t concrete v 340 @ | m ³ Rs cutting de Fe-3 kg/m ³ Rs vork in kg/m ³ Rs | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weigh 15118.44 15118.44 70.77 | kg kg 559787.3' t of cement as pe kg kg 21397.1 |
| 5 | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering include | ent for 1 level. Th 1 g water p | 44.47 R.C.C. wo ermo-Mec 5335.92 proofing n 302.37 | 0.45 m ³ ork includ chanically 44.47 kg naterial in 44.47 bags pping etc. | 0.1 ing stra Treatec m ³ cemen m ³ | 1.08 44.47 @ aightening, 1 bars of gra 120 @ t concrete v 340 @ emoval of t | m ³ Rs cutting de Fe-: kg/m ³ Rs vork ir kg/m ³ Rs corm fo | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weigh 15118.44 15118.44 70.77 | kg kg 559787.3' t of cement as pe kg kg 21397.1 |
| 5 | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering incluc columns, etc. for mass concrete | ent for l level. Th g water p | 44.47 R.C.C. we ermo-Mee 5335.92 proofing n 302.37 tting, pro 13.20 | 0.45 m ³ ork includ chanically 44.47 kg material in 44.47 bags pping etc. | 0.1 ing stra Treatec m ³ cemen m ³ and m | 1.08 44.47 @ aightening, bars of gra 120 @ t concrete v 340 @ emoval of f | m ³ Rs cutting de Fe-3 kg/m ³ Rs vork ir kg/m ³ Rs form for m ² | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weigh 15118.44 15118.44 70.77 | kg kg 559787.3' t of cement as pe kg kg 21397.1 |
| 5 | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering inclue columns, etc. for mass concrete Bottom slab | ent for l level. Th g water p | 44.47 R.C.C. we ermo-Mee 5335.92 proofing n 302.37 tting, pro | 0.45 m ³ ork includ chanically 44.47 kg material in 44.47 bags pping etc. | 0.1 ing stra Treatec m ³ cemen m ³ and m | 1.08 44.47 @ aightening, 1 bars of gra 120 @ t concrete v 340 @ emoval of f 15.84 15.84 | m ³ Rs cutting de Fe-3 kg/m ³ Rs vork ir kg/m ³ Rs form for m ² | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weigh 15118.44 15118.44 70.77 | ng in position an kg 559787.3 t of cement as pe kg kg 21397.1 footings, bases of |
| 6 | +od16 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total | ent for l level. Th 1 g water p 1 ding stru 2 ding stru | 44.47 R.C.C. we ermo-Mee 5335.92 proofing n 302.37 tting, pro 13.20 15.84 tting, pro | 0.45 m ³ ork includ chanically 44.47 kg naterial in 44.47 bags pping etc. m ² pping etc. | 0.1 ing stra Treatec m ³ cemen m ³ and r | 1.08 44.47 @ aightening, 1 bars of gra 120 @ t concrete v 340 @ emoval of t 15.84 15.84 @ | m ³ Rs cutting de Fe-3 kg/m ³ Rs vork ir kg/m ³ Rs form for m ² Rs | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weight 15118.44 15118.44 70.77 or :Foundations, 350.00 | ng in position an kg kg 559787.3' t of cement as per kg 21397.1' footings, bases of 5544.0 |
| 6 | +od16 4.12 5.9.1 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ | ent for l level. Th 1 g water p 1 ding stru 2 ding stru | 44.47 R.C.C. we ermo-Mee 5335.92 proofing n 302.37 tting, pro 13.20 15.84 tting, pro | 0.45 m ³ ork includ chanically 44.47 kg material in 44.47 bags pping etc. m ² pping etc. rrses etc. | 0.1 ing stra Treatec m ³ cemen m ³ and r | 1.08 44.47 @ aightening, 1 bars of gra 120 @ t concrete v 340 @ emoval of t 15.84 @ emoval of t | m ³ Rs cutting de Fe-3 kg/m ³ Rs vork ir kg/m ³ Rs form for m ² Rs form for | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weight 15118.44 15118.44 70.77 or :Foundations, 350.00 | ng in position an kg kg 559787.3' t of cement as per kg 21397.1' footings, bases of 5544.0 |
| 6 | +od16 4.12 5.9.1 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering include columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering include attached pilasters, butteresses, p | ent for l level. Th 1 g water p 1 ding stru ling stru linth and | 44.47 R.C.C. wc ermo-Mec 5335.92 proofing n 302.37 tting, pro 13.20 15.84 tting, pro string cou | 0.45 m ³ ork includ chanically 44.47 kg material in 44.47 bags pping etc. m ² pping etc. rrses etc. | 0.1 ing stra Treatec m ³ cemen m ³ and r 0.6 and r | 1.08 44.47 @ aightening, 1 bars of gra 120 @ t concrete v 340 @ emoval of f 15.84 15.84 () @ emoval of f | m ³ Rs cutting de Fe-3 kg/m ³ Rs form fr m ² Rs form fr m ² Rs form fr m ² Rs | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weight 15118.44 15118.44 70.77 or :Foundations, 350.00 | kg kg 559787.3' t of cement as pe kg kg 21397.1 footings, bases o |
| 6 | +od16 4.12 5.9.1 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering include columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering include attached pilasters, butteresses, p For walls outside For walls inside | ent for l level. Th 1 g water p ding strue ding strue linth and 2 | 44.47 R.C.C. wc ermo-Mec 5335.92 proofing n 302.37 tting, pro 13.20 15.84 tting, pro string cou 12.00 | 0.45 m ³ ork includ chanically 44.47 kg material in 44.47 bags pping etc. m ² pping etc. rrses etc. | 0.1 ing stra Treatec m ³ cemen m ³ and r 0.6 and r 3.25 | 1.08 44.47 @ aightening, 1 bars of gra 120 @ t concrete v 340 @ emoval of f 15.84 15.84 @ emoval of f 78.00 66.0 | m ³ Rs cutting de Fe-3 kg/m ³ Rs form fr m ² Rs form fr m ² Rs form fr m ² Rs | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weight 15118.44 15118.44 70.77 or :Foundations, 350.00 | kg kg 559787.3' t of cement as pe kg kg 21397.1 footings, bases o |
| 6 | +od16 4.12 5.9.1 | Total Say Epoxy coated steel reinforcem binding all complete upto plinth Quantity as per item No.3 Total Say Extra for providing and mixing manufacturer's specification. Quantity as per item No.3 Total Say Centering and shuttering includ columns, etc. for mass concrete Bottom slab Total Say Centering and shuttering includ attached pilasters, butteresses, p For walls outside | ent for l level. Th 1 g water p 1 ding stru inth and 2 2 2 | 44.47 R.C.C. wo ermo-Mec 5335.92 proofing n 302.37 tting, pro 13.20 15.84 tting, pro string cou 12.00 11.00 | 0.45 m ³ ork includ chanically 44.47 kg material in 44.47 bags pping etc. m ² pping etc. rrses etc. | 0.1 ing stra Treatec m ³ cemen m ³ and r 0.6 and r 3.25 3 | 1.08 44.47 @ aightening, 1 bars of gra 120 @ t concrete v 340 @ emoval of f 15.84 15.84 @ emoval of f 78.00 66.0 | m ³ Rs cutting de Fe-3 kg/m ³ Rs vork ir kg/m ³ Rs form fo m ² m ² Rs form fo m ² m ² | , bending, placir 500D or more. 5335.92 5335.92 104.91 doses by weight 15118.44 15118.44 70.77 or :Foundations, 350.00 | kg kg 559787.37 t of cement as pe kg kg 21397.13 footings, bases o |

| 8 22.2 | Providing and applying integ structures like retaining walls tunnels / subway and bridge of water) for vertical surfaces an the same from negative (inter specified in ACI 212-3R-20 concrete as per DIN 1048 ar capable of self-healing of crac and the direction of the eng 3.1 leakage. For vertical surface to | of the base leck etc., p d 3 : 1 (3 µ nal) side w 10 i.e by d resistant cks up to a ineer-in-ch | ment, wat repared by parts integ ith the he reducing to 16 ba width of arge. The | er tanks, re y mixing i ral crystal lp of syntl permeabil r hydrosta 0.50mm. T product p | oof slat n the ra line slu hetic fil lity of tic pres | bs, podiums, tio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne ck shall be c | reserv (5 part water) The mat more gative arried | ior, sewage & wat is integral crystalli for horizontal surf terial shall meet th than 90% comp side. The crystalli out all complete as | er treatment plant, ine slurry : 2 parts àces and applying he requirements as ared with control ine slurry shall be s per specification |
|---------|---|--|---|---|--|--|--|--|---|
| | Inside of walls | 2 | 11.00 | | 3 | 66.00 | m ² | | |
| | Total | | | | | 66.00 | m ² | | |
| | Say | | 66.00 | m ² | | a | Rs | 595.28 | 39288.16 |
| 9 22.2 | Providing and applying integ structures like retaining walls tunnels / subway and bridge of water) for vertical surfaces an the same from negative (inter specified in ACI 212-3R-20 concrete as per DIN 1048 ar capable of self-healing of crac and the direction of the eng 3.2 leakage. For horizontal surface | of the base leck etc., p d 3 : 1 (3 µ nal) side w 10 i.e by d resistant cks up to a ineer-in-ch | ment, wat repared b parts integ ith the he reducing to 16 ba width of arge. The | er tanks, ro y mixing i ral crystal lp of syntl permeabil r hydrosta 0.50mm. T product p | bof slat n the ra line slu hetic fil lity of tic pres | os, podiums, tio of 5 : 2 rry : 1 part ber brush. T concrete by ssure on ne ck shall be c hance shall | reserv (5 part water) 'he mat more gative carried carry g | ior, sewage & wat is integral crystalli for horizontal surf terial shall meet th than 90% comp side. The crystalli out all complete as | er treatment plant, ine slurry : 2 parts àces and applying he requirements as ared with control ine slurry shall be s per specification |
| | Bottom slab inside | 1 | 5.50 | 5.50 | | 30.25 | m ² | | |
| | Total | | | | | 30.25 | m ² | | |
| | Say | | 30.25 | m ² | | a | Rs | 458.77 | 13877.78 |
| 10 13.7 | .1 12 mm cement plaster finished | l with a flo | ating coat | of neat cer | ment :1 | :3 (1 cemen | t : 3 fin | ie sand) | |
| | Inside of walls | 2 | 11.00 | | 3 | 66.00 | m ² | | |
| | Outside walls | 2 | 12.00 | | 3.25 | 78.00 | | | |
| | Base slab inside | 1 | 5.50 | 5.5 | | 30.25 | m ² | | |
| | Walkway | 4 | 6.00 | | 1 | 24.00 | | | |
| | Total | | | | | 198.25 | m ² | | |
| | Say | | 198.25 | m ² | | <i>(a)</i> | Rs | 418.79 | 83024.58 |
| 11 19.1 | Providing orange colour safety on 12 mm dia steeel bar confo over all minimum length 263 r protruded legs having 2 mm tr adequate anchoring projection stand the bend test and chemic permanent identification mark | rming to IS nm and wid ead on top s on tail ler al resistance | 1786, ha hth as 165 surface by ngth on 13 ce test as p | ving minin mm with v ribbing o 8 mm as p per specific | num cro minimu r chequ er stand cations | oss section a im 112 mm hering beside dard drawin and having ng fixing in | space b space b snece g and s manufa manhol | m x 25 mm and between ssary and uitable to with actures | |
| | | 8 | | | | 8 | No. | | |
| | Say | | | No. | | - | Rs | 568.88 | 4551.04 |
| 12 100. | Filling water with 5000 litre ta (average) to the reservoir site a 5 HP diesel engine pump set , 36 complete. | and pumpir | ng the wat | er into the | reservo | oir of height | not les | s than 3 m using | |
| | | 1 | 5.50 | 5.5 | 2.5 | 75.63 | m3 | | |
| | total | | | | | 75.63 | | | |
| | Say | | | Kilo litre | | | Rs | 218.95 | 16557.86 |
| 13 10.2 | Providing and fixing hand rail 6.3 staircase railing and similar w | | | | | | | | |
| | 50mm dia G.I5.17kg/m , 3 Outer total 27.60 m/1m c/c | 32mm dia | GI-3.17k | g/m | | | | | |
| | vertical 50mm dia | 28 | | | 0.75 | 5.17 | kg | 108.57 | |

| | | | | | | | | 1 | 1 | |
|---------|--------------|--|----------|-------------|--------------|----------|---------------|---------------|-------------------|--------------------|
| | | Horizontal 0.25m c/c-32mm dia | 3 | 27.6 | | | 3.17 | kg | 262.48 | |
| | | Say | | 371.046 | kg | | | Rs | 194.18 | 72049.40 |
| 14 | 13.48.3 | Finishing with Deluxe Multi surf | ace pair | it system f | or interior | s and e | teriors usin | g prim | er as per | |
| | | vertical pipe | 28 | 0.75 | | 0.05 | 1.05 | m2 | | |
| | | Horizontal pipe | 3 | 27.6 | | 0.03 | 2.65 | m2 | | |
| | | Say | | 3.70 | m2 | | (a) | Rs | 154.62 | 572.04 |
| 15 | 13.52.2 | | or more | coats) at | all location | is prepa | 0 | | per | |
| | | Base slab & inside walls | 1 | 96.25 | | | 0 | | 96.25 | |
| | | Say | | 96.25 | | | (a) | Rs | 232.68 | 22395.00 |
| | | Total- Treated water Tank | 1 | | | | 0 | | | 1475837.70 |
| | | | ТОТА | L FOR S | TP UNIT | S | | | | ₹ 36,500,846 |
| | | | | | | | | | | |
| EC | O-FRII | ENDLY UNITS | | | | | | | | |
| m | Code | Description | No | L | В | H | V | Unit | Rate | Amount |
| | Green | Belt, Special Exterior Wall Garder | n and La | ndscaping | g, 3 layer b | uffer v | egetation in | the out | er periphery with | provision for |
| a | | ape and internal roads. | | | | | - | | | - |
| | | | 1 | Nos. | | | a | Rs | 1155000.00 | 1155000.00 |
| | | Total- Eco-friendly units | | | | | | | | 1155000.00 |
| b | Facility | y for Recycling Purposes | | | | | | | - | |
| | | | 1 | Nos. | | | <i>a</i> | Rs | 150000 | 150000.00 |
| | | Total- Facility for recycling purp | oses | | | | | | | 150000.00 |
| с | Pump l | house building above wells | 1 | 1 | T | | 1 | | T | T |
| | | Wells | | Nos. | | | - | Rs | 1100000.00 | 5500000.00 |
| | | Compound wall for well site | 4 | Nos. | | | a | Rs | 350000.00 | 1400000.00 |
| d | Equipn | nent, Laboratory items, Furniture | | | tem for CI | PS of Ic | | | T | T |
| | | | | Nos. | | | @ | Rs | 133928.57 | 133928.57 |
| e | Constru | uction of adminidtaration cum lab | · · | | | | 1 | . | | |
| | | | 1000 | Sq.m | | | @ | Rs | 16000.00 | 1600000.00 |
| | | Compound wall | 1 | | | | a | Rs | 1500000.00 | 1500000.00 |
| ME | 1 | ICAL ITEMS | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| m No | Item Code | | NT | Ŧ | n | | X 7 | T T •/ | D (| |
| 110 | Coue | Description | No | L | В | H | V | | Rate | Amount |
| 1 | | Raw Effluent Transfer pump - S | | | | | g, testing an | d trial | run of submersib | le sewage handling |
| 1 | | type pump, with specified discha | arge and | head and | of reputed | make. | | <u> </u> | 1 | 1 |
| | | | | | | | | | | |
| | | Power of pump required | | HP | Q | 25.44 | | Н | 12.00 | m |
| | | | 2 | Nos. | | | a | Rs | 248806.08 | 497612.16 |
| | | Bar Screen- Supply and installa | | | | | | | | |
| | | specified width, with MS flat l provided with MS rake arm w | | | | | | | | |
| | | collected solids.Flow Rate and h | | | | | | | | |
| 2 | | 50x10 mm | | | | | | | | , |
| | | | | | | | 2/ | | | |
| | | Width of screen channel-STP | 0.75 | m | Q | 0.05 | m3/sec | Н | 1.20 | m |
| | | Width of screen channel-CTU | 0.45 | m | Q | 0 | m3/sec | Н | 0.60 | m |
| | | | | | ~ | - | | | | |
| | | | 4 | No. | | | a | Rs | 25000.00 | 100000.00 |
| | | For lift stations | 24 | No. | | | <i>(a)</i> | Rs | 25000.00 | 600000.00 |
| | | | 1 | | 1 | | | | | |
| | | For Wells | 10 | No. | | | a | Rs | 25000.00 | 250000.00 |
| | | Total | | | | | | | | 950000.00 |

| | Bar Screen-fine- Supply and ins specified width, with MS flat b provided with MS rake arm wi | ars and | 20 mm (| c/c gap be | etween | bars. The f | rame t | o be mounted or | n the chamber and |
|----|--|--|--|--|---|---|--|--|---|
| 3 | collected solids.Flow Rate and he | | | | Angle | of Inclination | - | - | |
| | Width of screen channel | 0.75 | | Q | 0.046 | m ³ /sec | Η | 1.00 | m |
| | | 2 | No. | | | a | Rs | 25000.00 | 50000.00 |
| 4 | MBBR media- Supplying and Sp.Gravity 0.93 for MBBR reac technical specification or as direc | tor with | required | specific su | - | - | | | - |
| | specific surface area of carrier | - | - | 600.00 | m^2/m^3 | - | | | |
| | | 1 | | 316.78 | | 0 | Rs | 24553.57 | 7778178.57 |
| 5 | Air Blower Supply, erection, tes acoustic canopy, air filter, moto silencer with suitable flanges, interconnecting line with flange Engineer in Charge. | or of 15 commo | 00 rpm , n motor ; | pulleys, p and comp | ressure ressor | gauges, pro base frame | essure with | relief valve, acou motor belt tight | ustic hood, suction ening arrangement |
| | Capacity of blower | | | 3760.00 | m ³ /hou | ır | | | |
| | Power of motor | | | 56.00 | HP | | | | |
| | | 5 | | | | @ | Rs | 840000.00 | 4200000.00 |
| 6 | Bubble Diffuser for MBBR- Fin- dia,1500mm length, Ethylene P foundation bolt 6 mm, SS C clar clamp, RCC block complete as p | ropylen np suita | e Diene M ble for 1"(| Monomer D.D, hose, | (EPDM PP Ro | 1) make wit ppe, PP swiv | th SSte rel nut, | ee1"x1",SS lifting PP sleeve, Silico | g hook 8 mm, SS |
| | | 4 | | | | a | Rs | 31250.00 | 125000.00 |
| 7 | Air Grid Pipe Supply and install blowers to various tanks as a con | | | (HDPE) a | issembl | ly into valve | s and o | other accessories | as required for the |
| | | 4 | | | | @ | Rs | 44642.86 | 178571.43 |
| 8 | Tube settler media- Media to be 1.0mm thick and with tongue a minimum at 60° slope. The media Total contact area | nd groo | ove tube f | itting. The | e plan | settling area | ı shoul | · · | • |
| | | 1 | | | | a. | Rs | 66964.29 | 66964.29 |
| 9 | Electromagnetic Flow meter, pres quality sensors compatible to Io flow/quality/pressure integrator v housing arrangements, etc. comp Engineer in Charge | T and c with ser | entral cor sors, total | ntrol system iser, trans | n with mittal a | flow record and display a | ler, dig arrange | gital flow/quality/ ements and all ac | pressure indicator, cessories including |
| | | 5 | | | | a | Rs | 44642.86 | 223214.29 |
| 10 | Filter feed pump - Supply, Insta pump, with specified discharge a | | | - | - | d trial run o | f subm | nersible filtered w | vater handling type |
| | Power of pump required | 23.00 | HP | Q | 24.38 | | Н | 35.00 | m |
| | | 2 | Nos. | | | a | Rs | 404442.12 | 808884.24 |
| | Pressure Sand Filter- Supply, in construction. Filter to be of MS provided along with the filter. F capacity to be sufficient to initiat outlet for backwash and air vent. be fitted with flow meter – turbin pipe line. Media to consist of gra | S constr iltration the backv Sand fi ne type | ruction wi rate shou vash once lter to be f / rotamete | th multipo ld not be g in 8 hours itted with r type with | ort valv greater i.e. ond pressur n range | ve for opera than 12 m ³ / ce / shift. Fil e guage at in up to minin | tions. hour/m ter to h nlet and num of | Suitable stand / n^2 of the filtration nave inlet and out doutlet. Sand filte 125% of the rate | support should be a area. Dirt loading let piping, inlet and er main header is to ed flow through the |
| 11 | in CPHEEO manual and all relev Flow | | | Diameter | | ides supporti m | ing fou H | ndation. | m |

| | | 2 | | | | @ | Rs | 1527777.50 | 3055555.00 |
|----|---|-----------|----------------------|-------------|-----------|---------------|----------|-------------------------------|--------------------|
| | Carbon Filter- Supply, Installatio | n and ei | rection te | sting and c | omitio | ning of Acti | vated (| [°] arbon Filter - M | S composite vessel |
| | construction. Filter to be of MS | | | | | | | | |
| | provided along with the filter. Fi | | | | | | | | |
| | inlet and outlet piping, inlet and | | | | | | | | |
| | Media to consist of graded pebb provided in CPHEEO manual. A | | | | | | | | |
| 12 | waste water purification. Cost inc | | | | or mg. | quanty for | 1011101 | ur of impairies | |
| | Flow | 87.76 | m ³ /hour | Diameter | 2.5 | m | Н | 2.50 | m |
| | | 2 | | | | a | Rs | 1583332.50 | 3166665.00 |
| | Total | | | | | | | | |
| | Alum and Lime Dosing System- | Supply | installati | on comm | itioning | and testing | of Al | um dosing tank l | having capacity 50 |
| | litre in LLDPE/ FRP/PP material | | | | | | | | |
| 13 | pressure | | | | | | | | |
| | | 2 | | | | a | Rs | 25000.00 | 50000.00 |
| | Total | | | | | | | | |
| | | | | | | | | | |
| 14 | Hypo Dosing System - Supply, in | | | | | | | | |
| 14 | FRP/PP material and hypo dosing | | nic meteri | ng type pu | imp of | | | 30000.00 | |
| | Total | 2 | | | | a | Rs | 30000.00 | 60000.00 |
| | Total | | | | | | | | |
| 15 | Odour control unit for co-treatme | nt unit a | and STP | | | | | - | |
| | | 2 | | | | a | Rs | 30000.00 | 60000.00 |
| | Sludge transfer to thickener put | | | | | | ting ar | nd trial run of su | ubmersible sewage |
| 16 | handling type pump, with specific | ed disch | arge and l | nead and o | f repute | ed make. | | | |
| | | 1 0 0 | | | | | | | |
| | Power of pump required | 1.00 | | Q | 2.32 | LPS | Н | 15.00 | m |
| | | 2 | Nos. | | | a | Rs | 27645.12 | 55290.24 |
| | Sludge transfer to centrifuge pur | p of scr | ew type - | Supply, In | stallatio | on, Commiss | sioning | , testing and trial | run of submersible |
| 17 | sewage handling type pump, with | - | | ī. | - | - | | | |
| | Power of pump required | 0.30 | | Q | 0.71 | LPS | Η | 15.00 | m |
| | | 2 | Nos. | | | a | Rs | 8293.54 | 16587.07 |
| | Filter backwash pumps - Supply, | | | | g, testin | g and trial r | un of fi | ilter backwash pu | mp, with specified |
| 18 | discharge and head and of repute | | | cessories. | | | | | |
| | Power of pump required | 2.00 | | | | | | | |
| 10 | 111 · 1 | | Nos. | | | (d) | Rs | 55290.24 | 110580.48 |
| 19 | Filtrate cum dilution pump to equ | | | | | | | | |
| | Power of pump required | 1.00 | | | | | D | | |
| 20 | Description (| | Nos. | | | <u>(a)</u> | Rs | 27645.12 | 55290.24 |
| 20 | Recycled water transfer pump for | 3.5 | n tank HP | | | | | | |
| | Power of pump required | 5.5 | 111 | 1 | | | l | | |
| | | 2 | Nos. | | | \bigcirc | Rs | 96757.92 | 193515.84 |
| 21 | Diluted septage transfer pump for | | 105. | 1 | | W | 115 | 70131.92 | 175515.04 |
| | Power of pump required | 3.00 | HP | | | | | | |
| | | | Nos. | | | (A) | Rs | 82935.36 | 165870.72 |
| 22 | Mechanical arrangement for oil a | | | | | <u>u</u> | | 52755.50 | 100010.12 |
| | and a standard an angement for on a | - | Nos. | | | Ø | Rs | 25000.00 | 25000.00 |
| 23 | Mechanical arrangement for prim | | | | | u | 100 | 20000.00 | 23000.00 |
| 25 | | - | Nos. | | | Ø | Rs | 500000.00 | 500000.00 |
| | | 1 | 00. | 1 | | u u | | 200000.00 | 20000000 |

| 22 | | Sewage transfer pump - S pump, with specified disch | | | | | ng and tr | ial run o | of submersible sev | vage | handling typ |
|---------|-------|--|------------|-------------------|--------------|--------------|------------|-----------------|-----------------------------------|------|---------------|
| 22 | | For lifting stations | | | | | | | | 1 | |
| | | LF-1 | 0.5 | НР | Q | 0.58 | LPS | Н | 3.51 | m | |
| | | LF-2 | | HP | Q | 3.65 | LPS | Н | 6.39 | m | |
| | | LF-3 | | HP | Q | 8.40 | LPS | Н | 7.07 | m | |
| | | LF-4 | | HP | Q | 3.17 | LPS | Н | 7.69 | m | |
| | | LF-5 | | HP | Q | 2.30 | LPS | Н | 8.34 | m | |
| | | LF-6 | | HP | Q | 3.17 | LPS | Н | 14.10 | m | |
| | | LF-7 | 0.5 | | Q | 0.72 | LPS | Н | 4.69 | m | |
| | | LF-8 | 1.5 | | Q | 5.40 | LPS | Н | 7.79 | m | |
| | | LF-9 | 0.5 | | Q | 1.82 | LPS | Н | 8.04 | m | |
| | | LF-10 | 0.5 | | Q | 0.86 | LPS | Н | 6.49 | m | |
| | | LF-11 | 0.5 | | Q | 1.06 | LPS | Н | 9.32 | m | |
| | | LF-12 | 0.5 | | Q | 1.49 | LPS | Н | 6.34 | m | |
| _ | | LF-12 LF-13 | 0.5 | | Q | 1.49 | LPS | H | 0.34 7.69 | m | |
| _ | | LF-13 LF-14 | 0.5 | | Q | 0.62 | LPS | н Н | 3.04 | - | |
| _ | | LF-14 LF-15 | 0.5 | | - | 0.62 0.77 | LPS LPS | _ | 9.98 | m | |
| _ | | LF-15 LF-16 | 0.5 | | Q Q | 0.77 1.49 | LPS LPS | H H | 9.98 2.43 | m | |
| | | | | | | | | _ | | m | |
| | | LF-17 | 0.5 | | Q | 0.38 | LPS | H | 9.04 | m | |
| | | LF-18 | | | Q | 2.16 | LPS | Н | 8.18 | m | |
| | | LF-19 | | HP | Q | 4.09 | LPS | Н | 7.26 | m | |
| | | LF-20 | 0.5 | | Q | 0.77 | LPS | Н | 7.85 | m | |
| | | LF-21 | 0.5 | | Q | 0.14 | LPS | Н | 11.06 | m | |
| | | LF-22 | 0.5 | | Q | 1.81 | LPS | Η | 7.89 | m | |
| | | LF-23 | 0.5 | | Q | 1.90 | LPS | Η | 7.38 | m | |
| | | LF-24 | 1.5 | | Q | 4.76 | LPS | Η | 8.12 | m | |
| | | | 19.5 | HP | 2 | nos | | @ Rs | 27645.12 | | 1078160.0 |
| | | Pump sets in Well | | | | | | | | | |
| | | Well 1 to STP | 15 | HP | Q | 12.5 | L | PS H | 37.00 | m | |
| | OD19 | Say | 2 | Nos. | | | a | Rs | 346434.00 | | 692868.0 |
| | | Well 2 to STP | 5 | HP | Q | 4.54 | L | PS H | 32.00 | m | |
| | OD19 | Say | 2 | Nos. | | | @ | Rs | 138817.20 | | 277634.4 |
| | | Well 3 to STP | | HP | Q | 4.74 | L | PS H | 21.50 | m | |
| | OD19 | Say | | Nos. | | - | @ | Rs | 138817.20 | | 277634.4 |
| | | Well 4 to STP | 5 | HP | Q | 5.18 | L | PS H | 21.00 | m | |
| | OD19 | Say | 2 | Nos. | | | @ | Rs | 138817.20 | | 277634.4 |
| | | Well 5 to STP | 15 | HP | Q | 6.44 | L | PS H | 70.00 | m | |
| | OD19 | Say | 2 | Nos. | | | @ | Rs | 354003.00 | | 708006.0 |
| 23 | | Sumply and installation of | antrif.com | | | | | | | | |
| دے | | Supply and installation of o | | Nos. | | | | @ Pa | 200000 00 | | 100000 |
| | | | | | | <u> </u> | | @ Rs | 200000.00 | | 400000.0 |
| 24 | | Piping, initial channel arran | | ass arrai Nos. | ngements, st | eel ladd | · · | work an @ Rs | d fire fighting arra 350000.00 | | ents 350000.0 |
| | | | | 1 100. | | I | I | | 550000.00 | ı | 220000. |
| LI e | ECTRI | CAL WORKS | | | | | 1 | | | | |
| | Item | | | | | | | | | | |
| | | Description | No | L | В | Н | v | Unit | Rate | Amo | unt |

| 1 | Interconnecting piping system: • valves to be in PP/PVC of Ball / should be provided at the comm PVC / HDPE. Detailed hydraulic | / Globe type• For non discharge hea | valves in ader of all | piping o process | of ID > 150 s pumps • D | mm, E osing l | Butterfly valves are | e preferred • NRV |
|----------|--|--|---|---|--|---|--|--|
| | | 1 Nos. | | | (a) | Rs | 200892.86 | 200892.86 |
| 2 | ELECTRICAL & INSTRUMEN magnetic flow meter, normal fle Panel shall be Non compartment size angle iron, channel, T -iron components to include, but not provisions to be given as per gui given in the technical specificat fixed, floor mounted and non c panel to each prime mover will conduit or (b) armored cables a should not be run on the ground conduits as appropriate. All inter | by meter, press alized free stand flats as required limited to, MC idelines of the El- tions AC: MS per ompartmentalized be based on Cl as appropriate Ca d or directly on t connecting cablin | re gauges, ing floor m l. Panel shi CB for inc ectrical aut owder coat l pane.INT EIG guideli ibling inclu he walls. C | , IoT ba ounted, all be s comer a hority. I ed pane ERCOI ines. Ca ides gla Cables t | ased sensors dust and ve uitable for 4 and for each Panel to be el with switt NNECTING ables to be anding and o be mounte ermination a | s, elect ermin p 415V, 1 n switc fabrica chgear chg chgear chg chg chg chg chg chg chg chg chg chg | rical panels – Pouroof, with reinfor 3-Phase,50 Hz inc hgear, suitable O ted based on the N components as p LING – Outgoing y protected either tion for each pri- tuitable runners / ries as per specific | wder coated MCC cement of suitable comer. Switchgear LR and contactor Motor Load List as er motor load list, feeders from AC through (a) PVC me mover. Cables cable trays / PVC cations. |
| \vdash | | 1 Nos. | | | a | Rs | 625000.00 | 625000.00 |
| 3 | Supply, installation and commiss | | enerator | | | | | |
| | | 7 Nos. | | | a | Rs | 120000.00 | 840000.00 |
| 4 | Supply and installation of acces including foundations | sories for electri | cal connec | tion and | d control un | its for | lifting stations ar | nd collection wells |
| | Lifting stations | 24 Nos. | | | @ | Rs | 100000.00 | 2400000.00 |
| | Collection wells | 5 Nos. | | | @ | Rs | 75000.00 | 375000.00 |
| | Total | | | | | | | 2775000.00 |
| 5 | Supply, installation and commiss | ioning of solar u | nits for lifti | ng stati | ons and coll | ection | wells | |
| | | 5 Nos. | | | @ | Rs | 50000.00 | 250000.00 |
| | | 29 Nos. | | | @ | Rs | 20000.00 | 580000.00 |
| 6 | Supply, installation and commiss | ioning of solar u | nits for STI |) | | | | |
| | | 1 Nos. | | | @ | Rs | 1000000.00 | 1000000.00 |
| 7 | Transformer unit of 315 KVA (1 | 1+1) | | | | | | |
| | | 2 | | | @ | Rs | 600000.00 | 1200000.00 |

| | <u></u> | | | - | | | | | | |
|---|---------|---|-----------|--------------------------------|----------------------------|---------------|---------------|----------------|-------------------|--------------------------|
| | CIVII | L CONSTRUCTION - SE | EWER | | | S,PUMPIN | • | IANHOLE | S ,LIFTING S | TATIONS AND |
| 1 | 16.83 | Taking out existing CC unserviceable material to the 50 metre lead as per direction | he dump | king paver b bing ground, f | locks from for which pa | footpath/ ce | ntral verge, | | | |
| | | 30% of road length | 30% | 27406 | 1 | | 8221.8 | m ² | | |
| | | | | | | | | | | |
| | | Total | | | | | 8221.8 | m ² | | |
| | | Say | | 8221.8 | m^2 | | | @Rs | 115.56 | ₹ 950,111.00 |
| 2 | 15.3 | Demolishing R.C.C. work in 50 metres lead as per dir | | | | including sta | cking of stee | l bars and o | disposal of unse | erviceable material with |
| | | 30% of road length | 30% | 27406 | 1 | 0.15 | 1233.27 | m ² | | |
| | | T. (1 | | | | | 1000.07 | 3 | | |
| | | Total | | 1000.07 | 3 | | 1233.27 | m ³ | 2.114.20 | T 2 0 40 552 00 |
| | | Say | | 1233.27 | m ³ | | | @Rs | 3,114.30 | ₹ 3,840,773.00 |
| 3 | 15.43.2 | Dismantling manually / by metres lead as per direction | n of Engi | ineer -in-Char | rge:Bituminc | | | | osal of unservice | able material within 50 |
| | | 40% of road length | 40% | 27406 | 1 | | 10962.4 | m ² | | |
| | | Say | | 10962.4 | m ² | | | @Rs | 376.75 | ₹ 4,130,084.00 |
| | | within a lead of 50 m Descpn | No | Length(total | Width(avg | Depth avg | | | | |
| | | Network pipeline | | | | | | | | |
| | | Sub zone Well-1(conduits 292 Nos | 1 | 7141 | 1 | 1.29 | 9211.89 | m ³ | | |
| | | Bedding | 1 | 7141 | 1 | 0.1 | 714.1 | | | |
| | | Sub zone Well-2(conduits 190 Nos | 1 | 4398.4 | 1 | 1.29 | 5673.94 | | | |
| | | Bedding | 1 | 4398.4 | 1 | 0.1 | 439.84 | | | |
| | | Sub zone Well-3(conduits 192Nos | | 4757.66 | 1 | 1.25 | 5947.08 | | | |
| | | Bedding | 1 | 4757.66 | 1 | 0.1 | 475.77 | | | |
| | | Sub zone Well-4(conduits | | 5605.24 | 1 | 1.35 | 7567.07 | | | |
| | | 213 Nos Bedding | 1 | 5605.24 | 1 | 0.1 | 560.52 | - | - | |
| | | Sub zone Well-5(conduits | | | | | | | | <u> </u> |
| | | 166 Nos | I | 5504.11 | 1 | 1.31 | 7210.38 | | | |
| | | Bedding | 1 | 5504.11 | 1 | 0.1 | 550.41 | | | |
| | | Pumping Main | | | | | 0 | | - | |
| _ | | Lifting stations | 1 | 720 | 1.5 | 1.5 | 1620 | ┨──── | | |
| _ | | well 1 to STP | 1 | 1154 | 1 | 1.5 | 1731 | | | |
| _ | | well 2 to STP well 3 to STP | 1 | 1104 50 | 1 | 1.5 1.5 | 1656 75 | + | - | |
| _ | | well 4 to STP | 1 | 1526 | 1 | 1.5 | 2289 | + | + | |
| - | | well 5 to STP | 1 | 2410 | 1 | 1.5 | 3615 | | | |
| _ | | Total | | 2110 | | | 49337.00 | m ³ | | |
| - | | Deductions | | | | | | | | 1 |
| | | Man hole 900 mm dia | 750 | 1.7 | 1 | 1.5 | 1912.50 | 1 | 1 | 1 |

| | Man hole 1200 mm dia | 79 | 2 | 1 | 1.5 | 237.00 | | | |
|----------|---|-----------------------------------|---|-----------------------------|--------------------|-----------|----------------|----------|----------------|
| | Man hole 1500 mm dia | 271 | 2.3 | 1 | 1.5 | 934.95 | | | |
| | Total deduction | | | | | 3084.45 | m ³ | | |
| | Total less deduction | | | | | 46252.55 | m ³ | | |
| | | | 46252.55 | m ³ | | | | | |
| 100.1.1 | Do for item 4All kinds of soil | 30% | 46252.55 | | | 13875.765 | @Rs | 579.85 | ₹ 8,045,862.0 |
| 100.1.5 | Do for item 4 Ordinay rock | 30% | 46252.55 | | | 13875.765 | @Rs | 842.10 | ₹ 11,684,782.0 |
| 100.2.3 | Medium rock with blasting | 5% | 46252.55 | | | 2312.6275 | @Rs | 1,043.15 | ₹ 2,412,417.0 |
| 100.2.7 | Medium rock with out blasting | 15% | 46252.55 | | | 6937.8825 | @Rs | 1,400.37 | ₹ 9,715,603.0 |
| 100.1.9 | Hardrock with blasting | 5% | 46252.55 | | | 2312.6275 | @Rs | 1,192.60 | ₹ 2,758,040.0 |
| 100.1.13 | Hard rock with out blasting | 15% | 46252.55 | | | 6937.8825 | @Rs | 1,624.48 | ₹ 11,270,451.0 |
| | depth exceeding 1.5m but not exceeding 20 cm in of excavated soil as directed, All kinds of soil(Ref. Item | depth, ir within a No. 2.11 | ncluding cons lead of 50 m: l of DSR) | olidating ea 1.50m to 3. | ch deposited 0m | | nming, wa | | |
| | Descpn | No | Length(total | Width(avg | Depth avg | | m ³ | | |
| | Sub zone Well-1(conduits 111 Nos | 1 | 2542.8 | 1 | 1 | 2542.8 | | | |
| | Sub zone Well-2(conduits 79Nos | 1 | 1956.01 | 1 | 0.98 | 1916.8898 | | | |
| | Sub zone Well-3(conduits 69 Nos | 1 | 1844.16 | 1 | 0.76 | 1401.5616 | | | |
| | Sub zone Well-4(conduits 96 Nos | 1 | 2624.62 | 1 | 1.09 | 2860.8358 | | | |
| | Sub zone Well-5(conduits 86 Nos | 1 | 2242.76 | 1 | 1.09 | 2444.6084 | | | |
| | Pumping Main | | | | | | | | |
| | Lifting stations | 1 | 720 | 1.5 | 1.5 | 1620 | | | |
| | Total | | | | | 12786.70 | m ³ | | |
| | Deductions | | | | | | | | |
| | Man hole 900 mm dia | 28 | 1.7 | 1 | 0.23 | 10.95 | | | |
| | Man hole 1200 mm dia | 159 | 2 | 1 | 0.798 | 253.76 | | | |
| | Man hole 1500 mm dia | 234 | 2.3 | 1 | 1.406 | 756.71 | 2 | | |
| | Total deduction | | | | | 1021.42 | m ³ | | |
| | Total less deduction | | | 2 | | 11765.27 | m ³ | | |
| 100.1.2 | Say Do for item 4All kinds of soil | 5% | 11765.27 11765.2744 | m ³ | | 588.26 | @Rs | 690.88 | ₹ 406,420.0 |
| 100.1.6 | Do for item 4 Ordinay rock | 30% | 11765.2744 | | | 3529.58 | @Rs | 1,041.24 | ₹ 3,675,142.0 |
| 100.2.4 | Medium rock with blasting | 10% | 11765.2744 | | | 1176.53 | @Rs | 1,242.28 | ₹ 1,461,577.0 |
| 100.2.8 | Medium rock with out blasting | 30% | 11765.2744 | | | 3529.58 | @Rs | 1,599.50 | ₹ 5,645,567.0 |
| 100.1.10 | | | | | | | | İ | |

| | 100.1.14 | Hard rock with out blasting | 15% | 11765.2744 | | | 1764.79 | @Rs | 266.78 | ₹ 470,811.00 |
|---|----------|---|-----------------------------------|---|---|--|----------------|----------------------------|---|------------------------|
| 6 | 100.1.3 | Excavating trenches of req depth exceeding 3m in dep layers not exceeding 20 cm excavated soil as directed, | th but no n in dept | ot exceeding 4 th, including of | 1.5 m, includ consolidating | ing getting or g each deposi | ut the excavat | ed soil, and ramming, v | then returning th vatering, etc. and | e soil as required, in |
| | | Descpn | No | Length(total | Width(avg | Depth avg | | m ³ | | |
| | | Sub zone Well-1(conduits 50 Nos | 1 | 1091.3 | 1 | 0.94 | 1025.822 | | | |
| | | Sub zone Well-2(conduits 41Nos | 1 | 1014.38 | 1 | 0.94 | 953.5172 | | | |
| | | Sub zone Well-3(conduits 23 Nos | 1 | 651.3 | 1 | 0.98 | 638.274 | | | |
| | | Sub zone Well-4(conduits 47 Nos | 1 | 1335.64 | 1 | 1.02 | 1362.3528 | | | |
| | | Sub zone Well-5(conduits 41 Nos Pumping Main | 1 | 1096.37 | 1 | 1 | 1096.37 | | | |
| | | Lifting stations | 1 | 660 | 1.5 | 1.5 | 1485 | | | |
| | | Total | | | | | 5076.34 | m ³ | | |
| | | Deductions | | | | | | | | |
| | | Man hole 1500 mm dia | 240 | 2.3 | 1 | 1.04 | 574.08 | | | |
| | | Total less deduction | | | | | 4502.26 | m ³ | | |
| | 100.1.3 | Do for item 4All kinds of soil | | | | | | | | |
| | 100.1.7 | Do for item 4 Ordinay rock | 10.0% | 4502.26 | | | 450.23 | @Rs | 1,240.37 | 558451.7 |
| | 100.2.5 | Medium rock with blasting | 10% | 4502.26 | | | 450.23 | @Rs | 1,441.41 | 648966.0 |
| | 100.2.9 | Medium rock with out blasting | 20% | 4502.26 | | | 900.45 | @Rs | 1,798.63 | 1619576.3 |
| | 100.1.11 | Hardrock with blasting | 10% | 4502.26 | | | 450.23 | @Rs | 1,590.87 | 716257. |
| | 100.1.15 | Hard rock with out blasting | 50% | 4502.26 | | | 2251.13 | @Rs | 2,022.75 | 4553473.2 |
| 7 | 100 | Excavating trenches of req depth exceeding 4.5m in de layers not exceeding 20 cm excavated soil as directed, | epth but n in dept within a | not exceeding th, including of lead of 50 m | g 6 m, includ consolidating : 4.5m to 6.0 | ing getting or g each deposi m.All kinds o | ut the excavat | ed soil, and ramming, v | then returning the vatering, etc. and | e soil as required, i |
| | | Descpn | No | Length (total) | Width(avg) | Depth avg | | m ³ | | |
| | | Sub zone Well-1(conduits 19 Nos | 1 | 415.82 | 1 | 0.95 | 395.029 | | | |
| | | Sub zone Well-2(conduits 25 Nos | 1 | 624.53 | 1 | 0.9 | 562.077 | | | |
| | | Sub zone Well-3(conduits 5 Nos | 1 | 135.4 | 1 | 0.7 | 94.78 | | | |
| | | Sub zone Well-4(conduits 23 Nos | 1 | 646.82 | 1 | 0.94 | 608.0108 | | | |
| | | Sub zone Well-5(conduits 14 Nos | 1 | 370.59 | 1 | 0.68 | 252.0012 | | | |
| | | Pumping Main | 1 | 600 | 1.5 | 1.5 | 1050 | | | |
| _ | | Lifting stations | 1 | 600 480 | 1.5 1.5 | 1.5 2.1 | 1350 1512 | | | |
| | | Total | 1 | 400 | 1.3 | 2.1 | 4773.90 | m ³ | | ļ |

| | | Deductions | | | | | | | | |
|----------|------------------|---|--|---|---|--|---|---|--|---|
| | | Man hole 1500 mm dia | 99 | 2.3 | 1 | 1.04 | 236.81 | | | |
| | | Total less deduction | | | | | 4537.09 | m ³ | | |
| | | Say | | 4537.09 | m ³ | | | | | |
| | 100.1.4 | Do for item 4All kinds of soil | | | | | | | | |
| | 100.1.8 | Do for item 4 Ordinay rock | 5.0% | 4537.09 | | | 226.85 | @Rs | 1,439.50 | 326550.5 |
| | 100.2.6 | Medium rock with blasting | 5% | 4537.09 | | | 226.85 | @Rs | 1,640.54 | 372156. |
| - | 100.2.10 | Medium rock with out blasting | 25% | 4537.09 | | | 1134.27 | @Rs | 1,997.77 | 2266010.5 |
| | 100.1.12 | Hardrock with blasting | 10% | 4537.09 | | | 453.71 | @Rs | 1,790.00 | 812140. |
| | 100.1.16 | Hard rock with out blasting | 55% | 4537.09 | | | 2495.4 | @Rs | 2,221.88 | 5544479.3 |
| 8 | 100.8. 1 | Fencing one side of trenche | | | | | | e in vertic | al casuarina po | le (girth 15cm to 24cm |
| — | ~` | fixed at 2 m intervals (Data | Prenare 2 | ed based on P 10962.504 | WD SDB - I | Item No.1009 | 21925.008 | m | | 1 |
| | | | 2 | 10902.304 | | | | m | | |
| | | Sav | | 21925.008 | m | | 21725.000 | @Rs | 32.76 | ₹ 718,263.0 |
| 9 | 3.2 | Fencing 1.50m high with t | vo rows | | | 15cm to 24c | m) tied with c | | | , |
| <i>_</i> | 100.8.2 | 24cm) fixed at 1.5m interva | | | | | | | r verticul cusuu | fina pole (girtir 15em |
| | | , | 2 | 16443.756 | | | 32887.512 | r | | |
| | | Total | _ | 101101700 | | | | - | | |
| | | | | | | | 32887.512 | m | | |
| 10 | 2.16.1 | Say Close timbering in trenches the face area timbered).Dep | | | horing and p | packing cavit | 32887.512 ies (wherever | @Rs | 110.68 complete (Meas | ₹ 3,639,990.0 surements to be taken of |
| 10 | 2.16.1 | Say Close timbering in trenches | | ng strutting, s | horing and p | packing cavit | | @Rs | | |
| 10 | 2.16.1 | Say Close timbering in trenches the face area timbered).Dep | oth not e | ng strutting, s xceeding 1.5r | horing and p | 1 | ies (wherever | @Rs required) | | |
| 10 | 2.16.1 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) | oth not e | ng strutting, s xceeding 1.5r | horing and p | 1 | ies (wherever 41110.5 | @Rs required) of m ² | | surements to be taken |
| - | 2.16.1 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Say Close timbering in trenches the face area timbered).Dep | 2 3 includi | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s | horing and p n m ² horing and p | 1.5 packing cavit | 41110.5 41110.5 | @Rs required) of m ² m ² @Rs | 159.65 | to be taken ₹ 6,563,291.0 surements to be taken |
| - | | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) | 2 3 includi | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s | horing and p n m ² horing and p | 1.5 packing cavit | 41110.5 41110.5 41110.5 ies (wherever 2286.84 | <pre>@Rs required) o m² @Rs required) o m² m²</pre> | 159.65 | surements to be taken ₹ 6,563,291.0 Surements to be taken Ht taken weighte |
| | | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total | 2 3 includi oth exceed | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 | horing and p n m ² horing and p ut not exceed | 1.5 packing cavit ding 3 m | ies (wherever 41110.5 41110.5 ies (wherever | @Rs required) of m ² @Rs required) of m ² m ² | 159.65 | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighte av |
| 11 | 2.16.2 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say | 2 s includio 2 2 | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 | horing and p n m ² horing and p ut not exceed m ² | 1.5 packing cavit ding 3 m | 41110.5 41110.5 41110.5 ies (wherever 2286.84 2286.84 | <pre>@Rs required) o m² m² @Rs required) o m² m² m² @Rs</pre> | 159.65 complete (Meas complete (Meas 173.45 | surements to be taken ₹ 6,563,291.0 surements to be taken Ht taken weighte av ₹ 396,652.0 |
| 11 | | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches the face area timbered).Dep | 2 s includi th exceed 2 s includi | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s | horing and p m ² horing and p ut not exceed m ² horing and p | 1.5 packing cavit ding 3 m 1.02 packing cavit | 41110.5 41110.5 41110.5 ies (wherever 2286.84 2286.84 | <pre>@Rs required) o m² m² @Rs required) o m² m² m² @Rs</pre> | 159.65 complete (Meas complete (Meas 173.45 | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighte av ₹ 396,652.0 |
| 11 | 2.16.2 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches | 2 3 includi 5 includi 5 includi 5 includi 5 2 2 2 | ng strutting, s xceeding 1.51 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s eding 3 m but 259.45 | horing and p m ² horing and p ut not exceed m ² horing and p | 1.5 packing cavit ding 3 m 1.02 packing cavit ng 4.5 m 0.98 | 41110.5 41110.5 41110.5 41110.5 2286.84 2286.84 ies (wherever 508.52 | <pre>@Rs required) o m² m² @Rs required) o m² m² m² @Rs</pre> | 159.65 complete (Meas complete (Meas 173.45 | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighte av ₹ 396,652.0 |
| 11 | 2.16.2 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches the face area timbered).Dep (5 % of Length for third & forth depth) | 2 s includi th exceed 2 s includi th exceed | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s eding 3 m but | horing and p m ² horing and p ut not exceed m ² horing and p | 1.5 packing cavit ding 3 m 1.02 packing cavit ng 4.5 m | 41110.5 41110.5 41110.5 41110.5 ies (wherever 2286.84 2286.84 ies (wherever 508.52 190.79 | @Rs required) of m ² @Rs required) of m ² @Rs required) of m ² | 159.65 complete (Meas complete (Meas 173.45 | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighte av ₹ 396,652.0 |
| 11 | 2.16.2 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches the face area timbered).Dep (5 % of Length for third & forth depth) Total | 2 3 includi 5 includi 5 includi 5 includi 5 2 2 2 | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s eding 3 m but 259.45 109.65 | horing and p m ² horing and p ut not exceed m ² horing and p not exceedi | 1.5 packing cavit ding 3 m 1.02 packing cavit ng 4.5 m 0.98 | 41110.5 41110.5 41110.5 41110.5 2286.84 2286.84 ies (wherever 508.52 | (@Rs) required) of m ² (@Rs) required) of m ² (@Rs) required) of m ² (@Rs) required) of m ² (@Rs) | complete (Meas 159.65 complete (Meas 173.45 complete (Meas | surements to be taken ₹ 6,563,291.0 surements to be taken Ht taken weighter av ₹ 396,652.0 surements to be taken |
| 111 | 2.16.2 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches the face area timbered).Dep (5 % of Length for third & forth depth) | 2 3 includi 5 includi 5 includi 5 includi 5 includi 5 1 2 2 2 2 | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s eding 3 m but 259.45 109.65 699.31 | horing and p m ² horing and p ut not exceed m ² horing and p not exceed m ² horing and p not exceed | 1.5 packing cavit ding 3 m 1.02 packing cavit ng 4.5 m 0.98 0.87 | 41110.5 41110.5 41110.5 41110.5 ies (wherever 2286.84 2286.84 ies (wherever 508.52 190.79 699.31 | @Rs required) of m ² @Rs required) of m ² @Rs required) of m ² | 159.65 complete (Meas complete (Meas 173.45 | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighto av ₹ 396,652.0 surements to be taken o |
| 111 | 5.16.2 2.16.3 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches the face area timbered).Dep (5 % of Length for third & forth depth) Total Say | 2 3 includi 5 includi 5 includi 5 includi 5 includi 5 includi 7 2 2 2 2 , PN8, 1 | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s eding 3 m but 259.45 109.65 699.31 | horing and p m ² horing and p ut not exceed m ² horing and p not exceed m ² horing and p not exceed | 1.5 packing cavit ding 3 m 1.02 packing cavit ng 4.5 m 0.98 0.87 | 41110.5 41110.5 41110.5 41110.5 ies (wherever 2286.84 2286.84 ies (wherever 508.52 190.79 699.31 | (@Rs) required) of m ² (@Rs) required) of m ² (@Rs) required) of m ² (@Rs) required) of m ² (@Rs) | complete (Meas 159.65 complete (Meas 173.45 complete (Meas | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighto av ₹ 396,652.0 surements to be taken o |
| 111 | 5.16.2 2.16.3 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches the face area timbered).Dep (5 % of Length for third & forth depth) Total Say Supply of PE Pipe, PE100 | 2 3 includi 5 includi 5 includi 5 includi 5 includi 5 includi 7 2 2 2 2 , PN8, 1 | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s eding 3 m but 259.45 109.65 699.31 | horing and p m ² horing and p ut not exceed m ² horing and p not exceed m ² m ² onforming to | 1.5 packing cavit ding 3 m 1.02 packing cavit ng 4.5 m 0.98 0.87 | 41110.5 41110.5 41110.5 41110.5 ies (wherever 2286.84 2286.84 ies (wherever 508.52 190.79 699.31 | <pre>@Rs required) o m² @Rs required) o m² @Rs required) o m² @Rs required) o m² @Rs</pre> | complete (Meas 159.65 complete (Meas 173.45 complete (Meas | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighte av ₹ 396,652.0 |
| 111 | 5.16.2 2.16.3 | Say Close timbering in trenches the face area timbered).Dep (50 % of total Length) Total Close timbering in trenches the face area timbered).Dep (10 % of Length for second depth) Total Say Close timbering in trenches the face area timbered).Dep (5 % of Length for third & forth depth) Total Say Supply of PE Pipe, PE100 For connection from | 2 3 includi 3 includi 5 includi 5 includi 5 includi 5 includi 7 2 2 2 - - - - - - - - - - - - - | ng strutting, s xceeding 1.5r 13703.5 41110.5 ng strutting, s eding 1.5 m b 1121 2286.84 ng strutting, s eding 3 m but 259.45 109.65 699.31 80 mm dia, c | horing and p m ² horing and p ut not exceed m ² horing and p not exceed m ² m ² onforming to | 1.5 packing cavit ding 3 m 1.02 packing cavit ng 4.5 m 0.98 0.87 | 41110.5 41110.5 41110.5 41110.5 ies (wherever 2286.84 2286.84 ies (wherever 508.52 190.79 699.31 16 | <pre>@Rs required) o m² @Rs required) o m² @Rs required) o m² @Rs required) o m² @Rs m² @Rs m² @Rs</pre> | complete (Meas 159.65 complete (Meas 173.45 complete (Meas | surements to be taken o ₹ 6,563,291.0 surements to be taken o Ht taken weighto av ₹ 396,652.0 surements to be taken o |

| | For course notwork | | | | | T | | |
|---|--|---|--|--|---|------------------------------------|----------|----------------------|
| | For sewer network | 1 | 27000 | | 27000 | 122 | | |
| | Deduction for man holes | 1 750 | 0.9 | | 27000 | | | |
| | Deduction for man noies | 730 | 1.2 | | 94.8 | | | |
| | | 271 | 1.2 | | 406.5 | | | |
| | Total deduction | 271 | 1.5 | | 1176.3 | | | |
| | Total less deduction | | | | 25823.7 | | | |
| | Say | | 25823.7 | m | | Rs | 1,892.11 | ₹ 48,861,2 |
| 100.98.1 43 KWA | Supply of PE Pipe, PE100, | PN8, 280 | | | | | | |
| | For sewer network | | | | | | | |
| | | 1 | 406 | | 406 | m | | |
| | Total | | | | 406 | m | | |
| | Say | | 406 | m | <u>a</u> | Rs | 2,924.43 | ₹ 1,187,3 |
| | Supply of PE Pipe, PE100, For sewer network | PN10, 90 | mm dia, co | onforming to IS | 4984/2016. | | | 1 |
| | pumping line-lifting | | | | | | | |
| | stations | 2 | 690 | | 1380 | | | |
| | Total | | | | 1380 | | | |
| | Say | | 1380 | m | a | Rs | 378.10 | ₹ 521,7 |
| | pumping line-lifting stations Total | 2 | 30 | | | m m | | |
| | Say | | 60 | m | | Rs | 555.65 | |
| | | | | | | | | ₹ 33,3 |
| 100.98.1 57 KWA | Supply of PE Pipe, PE100, | | | conforming to IS | 5 4984/2016. | | | ₹ 33,3 |
| 100.98.1 57 KWA | For well-2 to STP | 1 | 1104 | conforming to IS | 5 4984/2016. 1104 | | | ₹ 33,: |
| 100.98.1 57 KWA | For well-2 to STP For well-3 toSTP | | | conforming to IS | 3 4984/2016. 1104 50 | m | | ₹ 33, |
| 100.98.1 57 KWA | For well-2 to STP For well-3 toSTP Total | 1 | 1104 50 | | 5 4984/2016. 1104 50 1154 | m m | 897 58 | |
| 100.98.1 57 KWA | For well-2 to STP For well-3 toSTP | 1 | 1104 50 1154 | | 5 4984/2016. 1104 50 1154 @ | m | 897.58 | |
| 100.98.1 57 KWA 100.98.1 58 KWA | For well-2 to STP For well-3 toSTP Total Say | 1 | 1104 50 1154 | m I Isotomic | 5 4984/2016. 1104 50 1154 @ | m m Rs | 897.58 | |
| 100.98.1 57 KWA 100.98.1 58 KWA | For well-2 to STP For well-3 toSTP Total Say Supply of PE Pipe, PE100, For well-4 to STP Total | 1 1 PN10, 16 | 1104 50 1154 50 mm dia, o | m I Isotomic | 5 4984/2016. 1104 50 1154 @ 5 4984/2016. | m m Rs | 897.58 | ₹ 33,3 |
| 100.98.1 57 KWA 100.98.1 58 KWA | For well-2 to STP For well-3 toSTP Total Say Supply of PE Pipe, PE100, For well-4 to STP | 1 1 PN10, 16 | 1104 50 1154 50 mm dia, o | m I I I I I I I I I I I I I I I I I I I | 5 4984/2016. 1104 5(1154 (@ 5 4984/2016. 763 763 | m m Rs | 897.58 | ₹ 1,035, |
| 100.98.1 57 KWA 100.98.1 58 KWA 100.98.1 59 KWA | For well-2 to STP For well-3 toSTP Total Say Supply of PE Pipe, PE100, For well-4 to STP Total Say Supply of PE Pipe, PE100, | 1 1 PN10, 16 | 1104 50 1154 50 mm dia, 6 763 763 30 mm dia, 6 | m log | 5 4984/2016. 1104 50 1154 @ 5 4984/2016. 763 763 6 4984/2016. 8 4984/2016. | m m Rs m Rs | | ₹ 1,035, |
| 100.98.1 57 KWA 100.98.1 58 KWA 100.98.1 59 KWA | For well-2 to STPFor well-3 toSTPTotalSaySupply of PE Pipe, PE100,For well-4 to STPTotalSaySupply of PE Pipe, PE100,For well-5 to STP | 1 1 PN10, 16 | 1104 50 1154 50 mm dia, 0 763 763 | m log | 5 4984/2016. 1104 50 1154 6 4984/2016. 763 763 6 4984/2016. 2 4984/2016. 2 410 | m m Rs m Rs | | |
| 100.98.1 57 KWA 100.98.1 58 KWA 100.98.1 59 KWA | For well-2 to STPFor well-3 toSTPTotalSaySupply of PE Pipe, PE100,For well-4 to STPTotalSaySupply of PE Pipe, PE100,For well-5 to STPTotal | 1 1 PN10, 16 | 1104 50 1154 50 mm dia, o 763 763 80 mm dia, o 2410 | m I I I I I I I I I I I I I I I I I I I | 5 4984/2016. 1104 50 1154 0 6 4984/2016. 763 763 763 6 4984/2016. 2 410 2 410 2 410 | m m Rs m Rs m | 1,177.03 | ₹ 1,035,0 ₹ 898,0 |
| 100.98.1 57 KWA 100.98.1 58 KWA 100.98.1 59 KWA | For well-2 to STPFor well-3 toSTPTotalSaySupply of PE Pipe, PE100,For well-4 to STPTotalSaySupply of PE Pipe, PE100,For well-5 to STP | 1 1 PN10, 16 | 1104 50 1154 50 mm dia, 6 763 763 30 mm dia, 6 | m I I I I I I I I I I I I I I I I I I I | 5 4984/2016. 1104 50 1154 0 6 4984/2016. 763 763 763 6 4984/2016. 2 410 2 410 2 410 | m m Rs m Rs | | ₹ 1,035, ₹ 898, |
| 100.98.1 57 KWA 100.98.1 58 KWA 100.98.1 59 KWA 100.98.1 59 KWA | For well-2 to STPFor well-3 toSTPTotalSaySupply of PE Pipe, PE100,For well-4 to STPTotalSaySupply of PE Pipe, PE100,For well-5 to STPTotalSaySupply of PE Pipe, PE100,For well-5 to STPTotalSaySupply of PE Pipe, PE100, | 1 1 PN10, 16 1 PN10, 18 1 1 | 1104 50 1154 50 mm dia, 6 763 30 mm dia, 6 2410 2410 5mm dia, co | m I I I I I I I I I I I I I I I I I I I | 5 4984/2016. 1104 5 (0) 1154 (@) 5 4984/2016. 763 763 763 (@) 5 4984/2016. 2410 2410 (@) 4984/2016. | m m Rs m Rs m Rs | 1,177.03 | ₹ 1,035, |
| 00.98.1 7 KWA 00.98.1 8 KWA 00.98.1 9 KWA 00.98.1 9 KWA 00.98.1 51 KWA | For well-2 to STPFor well-3 toSTPTotalSaySupply of PE Pipe, PE100,For well-4 to STPTotalSaySupply of PE Pipe, PE100,For well-5 to STPTotalSay | 1 1 PN10, 16 1 PN10, 18 1 1 | 1104 50 1154 50 mm dia, d 763 763 80 mm dia, d 2410 2410 | m I I I I I I I I I I I I I I I I I I I | 5 4984/2016. 1104 50 1154 (@ 5 4984/2016. 763 763 763 (@ 5 4984/2016. 2410 2410 (@ | m m Rs m Rs m Rs | 1,177.03 | ₹ 1,035,1 |

| 100.10.6 KWA | Laying HDPE pipes (IS : using automatic or semi au after testing, aligning the p potable water before back cost of pipe and fittings. | tomatic pipeline, | electrofusion lowering the | machines, to pipe in posi | esting the pipe line thus tion into the trenches al | fabricated t ready made, | to suit the hydrulic w , testing the line to su | vorking pressure ar uitable pressure wi |
|-----------------|---|--|---|------------------------------|--|-----------------------------|--|--|
| | For sewer network - 180 mm OD HDPE pipes | | | | | | | |
| | connection chamber to | 1 | 28600 | | 284 | | | |
| | manhole | 1 | 28600 | | 200 | 600 m | 277.10 | 3 7 007 53 |
| | Say Laying HDPE pipes (IS : | · • | 28600 | | <u> </u> | @ Rs | 277.19 | ₹ 7,927,53 |
| 100.10.8 KWA | using automatic or semi au after testing, aligning the p potable water before back cost of pipe and fittings. For sewer network - 225 | tomatic pipeline, | electrofusion lowering the | machines, to pipe in posi | esting the pipe line thus tion into the trenches al | fabricated t ready made, | to suit the hydrulic w , testing the line to su | vorking pressure a uitable pressure w |
| | mm OD HDPE pipes | | | | | | | |
| | Sewer network | 1 | 25823.7 | | 2582 | 3.7 m | | |
| | Say | | 25823.7 | m | | @ Rs | 393.81 | ₹ 10,169,5 |
| 3 | potable water before back cost of pipe and fittings. For sewer network - 280 mm OD HDPE pipes | | | le trenches l | | rge, nire to | r appliances etc. cor | npiete but excludi |
| - | For sewer network | 1 | 406 | | 4 | 06 m | | |
| | Say | | 406 | m | | @ Rs | 542.56 | ₹ 220,2 |
| KWA 4 | after testing , aligning the p potable water before back cost of pipe and fittings.(Pl | filling a | and leveling th | | | - | - | - |
| | For sewer network pumping line-lifting stations-90mm OD HDPE | | | | | | | |
| | | 1 | 1380 | | 13 | 80 m | | |
| | Total | | | | 13 | 80 m | | |
| | Say | | 1380 | m | | @ Rs | 97.37264 | ₹ 134,3 |
| 100.10.2 KWA | Laying HDPE pipes (IS : using automatic or semi au after testing , aligning the p potable water before back cost of pipe and fittings.(PI For sewer network pumping line-lifting stations-110mm OD HDPE | tomatic pipeline, filling a E100 PN | electrofusion lowering the and leveling the | machines, to pipe in posi | esting the pipe line thus tion into the trenches al | fabricated t ready made, | to suit the hydrulic w , testing the line to su | vorking pressure an uitable pressure wi |
| | | 1 | 60 | | | 60 m | | |
| | Total | | | | | 60 m | | |
| | Say | | 60 | m | | @ Rs | 132.04749 | ₹ 7,9 |
| 100.10.4 KWA | Laying HDPE pipes (IS : using automatic or semi au after testing, aligning the p | tomatic | electrofusion | machines, to | esting the pipe line thus | | | |

| | | | 1104 | | | PE | to STP-140mm OD HD | For well-2 to STP- | |
|---|--|---|---|---|---------------------------------|--|--|--|---|
| | | | 50 | | | | toSTP | For well-3 toSTP | |
| | | m | 1154 | | ļ | 1154 | 1 | Total | |
| ₹ 217,00 | 188.09337 | Rs | (a) | | m | 1154 | | Say | |
| ng pressure an e pressure wi | suit the hydrulic wor esting the line to suita | pricated to dy made, te | e line thus fab renches alread | es, testing the pip position into the | machines, pipe in po | electrofusion lowering the nd leveling th | DPE pipes (IS : 4984)o matic or semi automatic g , aligning the pipeline tter before back filling a | using automatic or after testing, align potable water befo | 100.10.5 KWA |
| | | | | | | 10) | e and fittings.(PE100 PI to STP160mm | For well-4 to STP1 | |
| | | | | | | | | OD HDPE | |
| ₹ 171,3′ | 224.60811 | m Rs | 763 | | | 763 763 | 1 | Say | - |
| ng pressure a e pressure wi | suit the hydrulic wor esting the line to suita | pricated to dy made, te | e line thus fab renches alread | es, testing the pip position into the | machines, pipe in po | electrofusion lowering the nd leveling th | DPE pipes (IS : 4984)o matic or semi automatic g , aligning the pipeline tter before back filling a e and fittings.(P100 PN to STP-180mm | using automatic or after testing , align potable water befo | 100.10.6 KWA |
| | | | | | | | | OD HDPE | |
| | | | 2410 | | | 2410 | 1 | | |
| ₹ 668,0 | 277.19 | Rs | @ | | m | 2410 | | Say | |
| | · · · · · · · · · · · · · · · · · · · | , | | | | | ter before back filling a | | |
| | | m | 1154 | | | | | For well-1 to STP- OD HDPE | |
| ₹ 454,45 | 393.81 | Rs | 0 | | m | 1154 1154 | to STP-225mm | For well-1 to STP- OD HDPE Say | 5 100.31.2. |
| excluding t | | Rs | (a) complete wit | | m m (with cap | 1154 1154 . sluice valve | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requ | For well-1 to STP- OD HDPE Say Supply ,"Conveyin | 5 100.31.2. 1+OD KWA 100.31.2. 1+OD KWA |
| . excluding t ₹ 306,0 | ts, rubber insertions | Rs h bolts, nu | @ complete wit 46 | | m m (with cap | 1154 1154 . sluice valve ired will be p | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requ 46 | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the ta | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA |
| . excluding t ₹ 306,0 ₹ 17,9 | 6652.74 | Rs h bolts, nu No | a complete wit | | m m (with cap | 1154 1154 . sluice valve ired will be p | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requession of the tail pieces of tail pieces o | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the t | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD KWA |
| excluding t ₹ 306,0 ₹ 17,9 ₹ 42,4 | 6652.74 8999.70 | Rs h bolts, nu No No | (a) complete wit 46 2 4 | | m m (with cap | 1154 1154 . sluice valve ired will be p | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requ 46 a 2 a 4 | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the ta 80 mm dia 110mm dia | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD |
| excluding t ₹ 306,0 ₹ 17,9 ₹ 42,4 ₹ 53,3 | 6652.74 8999.70 10606.76 13340.08 | Rs h bolts, nu No No No | (a) complete wit 46 2 4 4 | | m m (with cap | 1154 1154 . sluice valve ired will be p | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requ 46 a 2 a 4 a 4 | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the ta 80 mm dia 110mm dia 125mm dia | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD KWA 100.31.2. 4+OD |
| ₹ 306,0 ₹ 17,9 ₹ 42,4 ₹ 53,30 ₹ 33,6 ₹ 33,6 | 6652.74 8999.70 10606.76 13340.08 16805.29 nantling and taking b | Rs h bolts, nu No No No No etion, dism | @ complete wit 46 2 4 4 2 4 2 0 the site, erred | ng conveyance to | m s (with cap aid separat | 1154 1154 . sluice valve ired will be p | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requession of the tail pieces of tail p | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the ta 80 mm dia 110mm dia 125mm dia 150mm dia 200mm dia Bailing out water v | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD KWA 100.31.2. 4+OD KWA 100.31.2. 5+OD |
| ₹ 306,02 ₹ 306,02 ₹ 17,92 ₹ 42,42 ₹ 53,30 ₹ 33,6 ₹ 33,6 | 6652.74 8999.70 10606.76 13340.08 16805.29 nantling and taking b | Rs h bolts, nu No No No No etion, dism | @ complete wit 46 2 4 4 2 4 2 0 the site, erred | ng conveyance to of staff etc. co | m s (with cap aid separat | 1154 1154 . sluice valve ired will be p | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requession of the tail pieces) 46 46 46 4 4 4 4 4 4 4 4 4 4 4 4 4 | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the ta 80 mm dia 110mm dia 125mm dia 150mm dia 200mm dia Bailing out water v pump, cost of fue | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD KWA 100.31.2. 4+OD KWA 100.31.2. 5+OD KWA |
| ₹ 306,02 ₹ 306,02 ₹ 17,92 ₹ 42,42 ₹ 53,30 ₹ 33,6 ₹ 33,6 | 6652.74 8999.70 10606.76 13340.08 16805.29 nantling and taking b | Rs h bolts, nu No No No No ction, dism DATA (P | @ complete wit 46 2 4 4 2 0 the site, errent mplete. NEW | ng conveyance to of staff etc. co | m s (with cap aid separat | 1154 1154 . sluice valve ired will be pro- e and pumpse and other sto | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requession 46 46 4 4 4 4 4 4 4 4 4 4 4 4 4 | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the ta 80 mm dia 110mm dia 125mm dia 150mm dia 200mm dia Bailing out water v pump, cost of fue No.1070 | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD KWA 100.31.2. 4+OD KWA 100.31.2. 5+OD KWA |
| ₹ 306,0: ₹ 306,0: ₹ 17,9: ₹ 42,4: ₹ 53,3: ₹ 33,6 ₹ 33,6 ₹ 0 SDB - Ite | 6652.74 8999.70 10606.76 13340.08 16805.29 nantling and taking b | Rs h bolts, nu No No No No ction, dism DATA (P Kwh | @ complete wit 46 2 4 2 4 2 0 the site, errent mplete. NEW 6042.6 | ng conveyance to of staff etc. co | m s (with cap aid separat | 1154 1154 . sluice valve ired will be pro- e and pumpse and other sto | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requession 46 46 4 4 4 4 4 4 4 4 4 4 4 4 4 | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the ta 80 mm dia 110mm dia 125mm dia 150mm dia 200mm dia Bailing out water v pump, cost of fue No.1070 For 27km | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD KWA 100.31.2. 4+OD KWA 100.31.2. 5+OD KWA |
| ₹ 306,02 ₹ 17,92 ₹ 42,42 ₹ 53,33 ₹ 33,66 ₹ 0f engine a D SDB - Itee ₹ 233,063,1 ling and taki | its, rubber insertions 6652.74 8999.70 10606.76 13340.08 16805.29 nantling and taking b partling and taking b 38.57 site, errection, disma | Rs h bolts, nu No No No No etion, dism DATA (P Kwh Kwh Kwh @Rs nce to the | @ complete wit 46 2 4 4 4 2 0 the site, erre mplete. NEW 6042.6 6042.6 ding conveya | ng conveyance to of staff etc. co 0.746 | m s (with cap aid separat | 1154 1154 . sluice valve ired will be p e and pumpse and other state 54 6042.6 pumpset above | to STP-225mm 1 Conveying and fixing C. ve (the tail pieces if requestion of the tail pieces if the tail pi | For well-1 to STP- OD HDPE Say Supply ,"Conveyin cost of valve (the tr 80 mm dia 110mm dia 125mm dia 125mm dia 200mm dia Bailing out water v pump, cost of fue No.1070 For 27km Total Bailing out water v | 1+OD KWA 100.31.2. 1+OD KWA 100.31.2. 2+OD KWA 100.31.2. 3+OD KWA 100.31.2. 4+OD KWA 100.31.2. 5+OD KWA |

| | | Total | | | | | 4028.4 | Kwh | | |
|--------------|-----------------|---|-----------|----------------------------|---------------------|-----------------|----------|----------------|--------|---------------|
| | 0 2 | Say | | 4028.4 | Kwh | | | @Rs | 19.25 | ₹ 77,547.00 |
| 19 | 100.98.100 8 | Engaging Coolie - Bailing o | out water | r and control | ling traffic | | | | | |
| | | For 27km | 1 | 27 | 10 | | 270 | day | | |
| | | Say | | 270 | Day | | | @Rs | 917.26 | ₹ 247,660.00 |
| 20 | 2.6.1 | Earth work in excavation l width as well as 10 sqm on and neatly dressed.All kind | plan) in | cluding dispo - MAN HOL | osal of excav ES | ated earth, lea | | | | |
| _ | | | | | Manholes 0.9 | 1 | | | | |
| | | | NO | L | В | Avg ht | - | | | |
| | | Sub zone Well-1(Man holes | 204 | 1.7 | 1.7 | 1.5 | 884.34 | m ³ | | |
| | | Sub zone Well-2(Man holes | 130 | 1.7 | 1.7 | 1.5 | 563.55 | m ³ | | |
| | | Sub zone Well-3(Man holes | 137 | 1.7 | 1.7 | 1.5 | 593.9 | m ³ | | |
| | | Sub zone Well-4(Man holes | 135 | 1.7 | 1.7 | 1.5 | 585.23 | m ³ | | |
| | | Sub zone Well-5(Man holes | 144 | 1.7 | 1.7 | 1.5 | 624.24 | m ³ | | |
| _ | | | | N | Manholes 1.2 | 0 m dia | | | | |
| | | Sub zone Well-1(Man holes | 17 | 2 | 2 | 1.5 | 102 | m ³ | | |
| | | Sub zone Well-2(Man holes | 11 | 2 | 2 | 1.5 | 66 | m ³ | | |
| | | Sub zone Well-3(Man holes | 17 | 2 | 2 | 1.5 | 102 | m ³ | | |
| | | Sub zone Well-4(Man holes | 20 | 2 | 2 | 1.5 | 120 | m ³ | | |
| | | Sub zone Well-5(Man holes | 14 | 2 | 2 | 1.5 | 84 | m ³ | | |
| | | | | Ν | Aanholes 1.5 | 0 m dia | | | | |
| | | Sub zone Well-1(Man holes | 72 | 2.3 | 2.3 | 1.5 | 571.32 | m ³ | | |
| | | Sub zone Well-2(Man holes | 50 | 2.3 | 2.3 | 1.5 | 396.75 | m ³ | | |
| | | Sub zone Well-3(Man holes | 39 | 2.3 | 2.3 | 1.5 | 309.47 | m ³ | | |
| | | Sub zone Well-4(Man holes | 57 | 2.3 | 2.3 | 1.5 | 452.3 | m ³ | | |
| | | Sub zone Well-5(Man holes | 53 | 2.3 | 2.3 | 1.5 | 420.56 | m ³ | | |
| + | | For lift manhole panel | 24 | 1 | 0.45 | 0.6 | C 49 | m ³ | | |
| \downarrow | | board foundation | 24 | 1 | 0.45 | 0.6 | 6.48 | | | |
| + | | For Sewer chambers | 2200 | 1.3 | 1.3 | 1 | 3718 | m ³ | | |
| | | For Lifting station manholes-additional depth | 24 | 1.77 | | 1.00 | 42.39 | m ³ | | |
| | | Total | | | | | 9642.53 | m ³ | | |
| | | Say | | 9642.53 | m3 | | | | | |
| _ | 2.6.1 | Do for item 4All kinds of soil | 30% | 9642.53 | | | 2892.759 | @Rs | 223.41 | ₹ 646,271. |
| | 2.7.1 | Do for item 4 Ordinay rock | 30% | 9642.53 | | | 2892.759 | @Rs | 433.01 | ₹ 1,252,594.0 |
| | OD | Medium rock with blasting | 5% | 9642.53 | | | 482.1265 | @Rs | 541.27 | ₹ 260,961.0 |

| | OD | Medium rock with out blasting | 15% | 9642.53 | | | 1446.3795 | @Rs | 898.50 | ₹ 1,299,572.0 |
|----|---------------------|---|----------|----------------------------|------------------------------|-----------------|-----------|----------------|----------|---------------|
| | 2.7.2 | Hardrock with blasting | 5% | 9642.53 | | | 482.1265 | @Rs | 749.05 | ₹ 361,137.0 |
| | 2.7.3 | Hard rock with out blasting | 15% | 9642.53 | | | 1446.3795 | @Rs | 1,248.58 | ₹ 1,805,921.0 |
| 21 | OD-25 | Earth work in excavation width as well as 10 sqm on and neatly dressed. All kind | plan) in | cluding dispo - MAN HOL | sal of excava ES 2nd dept | ated earth, lea | | | | |
| | | | | | Manholes 0.9 | | | | | |
| | | Sub zone Well-1(Man | NO | L | В | Avg ht | | | 1 | |
| | | holes | 27 | 1.7 | 1.7 | 0.22 | 17.17 | m ³ | | |
| | | Sub zone Well-2(Man holes | 22 | 1.7 | 1.7 | 0.22 | 13.99 | | | |
| | | Sub zone Well-3(Man holes | 15 | 1.7 | 1.7 | 0.22 | 9.54 | | | |
| | | Sub zone Well-4(Man holes | 14 | 1.7 | 1.7 | 0.22 | 8.9 | | | |
| | | Sub zone Well-5(Man holes | 28 | 1.7 | 1.7 | 0.26 | 21.04 | | | |
| | | | | | (anhalas 1.2) |) an dia | | | | |
| | | Sub zone Well-1(Man | | | fanholes 1.2 | | | 2 | I | |
| | | holes | 17 | 2 | 2 | 0.81 | 55.08 | m ³ | | |
| | | Sub zone Well-2(Man holes | 11 | 2 | 2 | 0.8 | 35.2 | | | |
| | | Sub zone Well-3(Man holes | 17 | 2 | 2 | 0.74 | 50.32 | | | |
| | | Sub zone Well-4(Man holes | 100 | 2 | 2 | 0.82 | 328 | | | |
| | | Sub zone Well-5(Man holes | 14 | 2 | 2 | 0.82 | 45.92 | | | |
| | | | | Ν | fanholes 1.5 |) m dia | 1 | | • | |
| | | Sub zone Well-1(Man holes | 72 | 2.3 | 2.3 | 1.47 | 559.89 | m ³ | | |
| | | Sub zone Well-2(Man holes | 50 | 2.3 | 2.3 | 1.49 | 394.11 | | | |
| | | Sub zone Well-3(Man holes | 39 | 2.3 | 2.3 | 1.45 | 299.15 | | | |
| | | Sub zone Well-4(Man holes | 20 | 2.3 | 2.3 | 1.48 | 156.58 | | | |
| | | Sub zone Well-5(Man holes | 53 | 2.3 | 2.3 | 1.49 | 417.75 | | | |
| | | Total | | | | | 2412.64 | m ³ | | |
| | 2 (1 - 1 | Say Do for item 4All | | 2412.64 | m ³ | | | | | ₹ 0.00 |
| | dl lift | kinds of soil | 5% | 2412.64 | | | 120.632 | @Rs | 334.44 | ₹ 40,344.00 |
| | 2.7.1+ad dl lift | Do for item 4 Ordinay rock | 30% | 2412.64 | | | 723.792 | @Rs | 632.14 | ₹ 457,538.00 |
| | OD | Medium rock with blasting | 10% | 2412.64 | | | 241.264 | @Rs | 740.40 | ₹ 178,632.00 |
| | OD | Medium rock with out blasting | 30% | 2412.64 | | | 723.792 | @Rs | 1,097.64 | ₹ 794,463.00 |
| | 2.7.2+ad dl lift | Hardrock with blasting | 10% | 2412.64 | | | 241.264 | @Rs | 948.18 | ₹ 228,762.00 |
| | dl lift | Hard rock with out blasting | 15% | 2412.64 | | | 361.896 | @Rs | 1,447.71 | ₹ 523,920.00 |
| 22 | OD-26 | Earth work in excavation width as well as 10 sqm on and neatly dressed.All kind | plan) in | cluding dispo | sal of excava | ated earth, lea | | | | |
| | | | | Ν | fanholes 1.5 |) m dia | | | | |
| | | Sub zone Well-1(Man holes | 62 | 2.3 | 2.3 | 0.98 | 321.42 | m ³ | | |

| | Sub zone Well-2(Man | 45 | 2.3 | 2.3 | 1.08 | 257.09 | | | |
|-----------------------|--|--|--|---|---|---|---|--|---|
| | holes Sub zone Well-3(Man | | | | | | | | |
| | holes | 33 | 2.3 | 2.3 | 1.02 | 178.06 | | | |
| | Sub zone Well-4(Man holes | 52 | 2.3 | 2.3 | 1.06 | 291.58 | | | |
| | Sub zone Well-5(Man | 48 | 2.3 | 2.3 | 1.1 | 279.31 | | | |
| | holes Total | | | | | 8026.14 | m ³ | | |
| 2.6.1+2≭ addl lift | Do for item 4All kinds of soil | 0 | | | | 0 | | | |
| 2.7.1+2* addl lift | | 10.0% | 8026.14 | | | 802.61 | @Rs | 831.28 | 667193.64 |
| OD | Medium rock with blasting | 10% | 8026.14 | | | 802.61 | @Rs | 939.53 | 754076.17 |
| OD | Medium rock with out blasting | 20% | 8026.14 | | | 1605.23 | @Rs | 1,296.77 | 2081614.11 |
| 2.7.2+2* addl lift | * Hardrock with blasting | 10% | 8026.14 | | | 802.61 | @Rs | 1,147.31 | 920842.48 |
| 2.7.3+2≭ addl lift | | 50% | 8026.14 | | | 4013.07 | @Rs | 1,646.84 | 6608884.2 |
| 23 ^{L2-00} | Earth work in excavation width as well as 10 sqm on and neatly dressed.All kind | ı plan) in | cluding dispo | sal of excava | ated earth, lea | | | | |
| | | | Ν | Ianholes 1.5 | 0 m dia | | • | | |
| | Sub zone Well-1(Man holes | 23 | 2.3 | 2.3 | 1.18 | 143.57 | m ³ | | |
| | Sub zone Well-2(Man holes | 21 | 2.3 | 2.3 | 1.22 | 135.53 | | | |
| | Sub zone Well-3(Man holes | 8 | 2.3 | 2.3 | 0.7 | 29.62 | | | |
| | Sub zone Well-4(Man holes | 27 | 2.3 | 2.3 | 1.2 | 171.4 | | | |
| | Sub zone Well-5(Man holes | 20 | 2.3 | 2.3 | 0.88 | 93.1 | | | |
| | Total | | | | | 573.22 | m ³ | | |
| 2.6.1+3* addl lift | Do for item 4All kinds of soil | 0 | | | | 0 | | | |
| 2.7.1+3* addl lift | Do for item 4 Ordinay rock | 10.0% | 573.22 | | | 57.32 | @Rs | 1,030.41 | 59063.1 |
| OD | Medium rock with blasting | 10% | 573.22 | | | 57.32 | @Rs | 1,138.67 | 65268.56 |
| OD | Medium rock with out blasting | 20% | 573.22 | | | 114.64 | @Rs | 1,495.90 | 171489.98 |
| 2.7.2+3* addl lift | [*] Hardrock with blasting | 10% | 573.22 | | | 57.32 | @Rs | 1,346.45 | 77178.51 |
| 2.7.3+3* addl lift | | 50% | 573.22 | | | 286.61 | @Rs | 1,845.98 | 529076.33 |
| 24 59.001 | Providing steel sheet shori M wide stiffen on edges w levels with suitable pile dri 0.5 M above ground level exceeding 1.50M and hori are completed, dismantling and plants and sundries etc | vith 50 m iving equ suitably zontal sc g, cleanin c. comple | im x 50mm x ipments and a braced by ho rew jack type ng and restact te. | 6 mm M.S. accessories to prizontal wal e struts at 1.3 | angles drivin o a maximum lling pieces a 50M intervals se including a | g down vert depth of 0.5 t 75 x 150 n s and mainta all labour, hi | ically on eit 0 M below nm x 8 mm ining the sh re charges | ther side one after the bottom of the angles on either poring till the pipe | another in lines and proposed excavation side at intervals no s are laid and works |
| | Manhole 0.9m dia | 750 | 6.8 | | 1.5 | 7650 | m ² | | |
| | | | 0 | | 1.5 | 0.40 | - | | |
| | Manhole 1.2m dia Manhole 1.5m dia | 79 271 | 8 9.2 | | 1.5 1.5 | 948 3739.8 | | | |

| | | Total | | | | | 12337.8 | m ² | | |
|----|-----------------|--|---|---|--|---|---|---|--|---|
| | | Say | | 12337.8 | m ² | | | (a)Rs | 781.95 | ₹ 9,647,543.00 |
| 25 | 4.1.6 | Providing and laying in population plinth level : 1:3:6 (1 Ceme | | | | | | | | |
| | | Manhole 0.9m dia | 750 | 1.7 | 1.7 | 0.15 | 325.125 | m ³ | | |
| | | Manhole 1.2m dia | 79 | 2 | 2 | 0.15 | 47.4 | 1 | | |
| | | Manhole 1.5m dia | 271 | 2.3 | 2.3 | 0.15 | 215.04 | 1 | | |
| | | For lift manhole panel | 24 | 1 | 0.45 | 0.15 | 1.62 | | | |
| | | board foundation | | | | | | | | |
| | | For Sewer chambers | 2200 | 1.3 | 1.3 | 0.15 | 557.7 | | | |
| _ | | bedding for pipe laying | 1 | 27406.26 | 1 | 0.1 | 2740.626 | 3 | | |
| | | Total | | 2005 5005 | 3 | | 3887.5095 | m^3 | a coa o c | 7 20 2 (1 517 0) |
| 26 | _ | Say | | 3887.5095 | m ³ | | | @Rs | 7,527.06 | ₹ 29,261,517.00 |
| | 5.37.1 + 5.34.1 | Providing and laying in p Cement (SRC) content as transit mixer for all leads, concrete work, including p and reinforcement, includi improve workability witho | per app having o pumping ng cost o put impa | roved design continuous ag of R.M.C. fro of admixtures uring strength | mix, manufa gitated mixer om transit m in recommen and durab | actured in ful , manufactur nixer to site o ended propor ility as per o | ly automatic ed as per min of laying, exo tions as per I lirection of t | batching p c design of cluding the S : 9103 to he Enginee | lant and transport specified grade f cost of centering accelerate/ retar er-in-charge. (No | ted to site of work in for reinforced cemen , shuttering finishing d setting of concrete |
| _ | | considered in this item is @ | <i>t)</i> 330 kg | / [°] .Excess/less | cement use | d as per desig | n mix is paya | I | able separately). | 1 |
| | | 0.90m dia manholes -mat | 750 | 1.5 | 1.5 | 0.35 | 590.63 | m ³ | | |
| | | 1.20m dia manholes -mat | 79 | 1.8 | 1.8 | 0.4 | 102.38 | | | |
| | | 1.50m dia manholes -mat | 271 | 2.1 | 2.1 | 0.45 | 537.8 | | | |
| | | 0.90m dia manholes - cover slab(circular 3.14/4*1.5*1.5*0.3) | 750 | 1.77 | | 0.2 | 264.94 | | | |
| | | 1.20m dia manholes - cover slab(circular 3.14/4*1.8*1.8*0.3) | 79 | 2.54 | | 0.2 | 40.19 | | | |
| | | 1.50m dia manholes - cover slab(circular 3.14/4*2.1*2.1*0.3) | 271 | 3.46 | | 0.2 | 187.63 | | | |
| | | sewer chamber -mat | 2200 | 1 | 1 | 0.2 | 440.00 | | | |
| | | sewer chamber -cover slab | 2200 | 1 | 1 | 0.1 | 220.00 | | | |
| | | Sewer chamber walls | 2200 | 2.4 | 0.2 | 0.5 | 528.00 | | | |
| | | Deduct Manhome cover 600mm dia | 1100 | 0.28 | | 0.15 | 46.63 | | | |
| | | Total | | | _ | | 2864.94 | m ³ | ļ | |
| | | Say | | 2864.94 | m ³ | | | @Rs | 10,404.79 | ₹ 29,809,063.00 |
| 28 | 4.1.3 | Providing and laying in population population providing and laying in population population provides the provides and the pro | | | | | | | ering and shutter | ing - All work up to |
| | | | | Manhole pi | pe channel a | nd slanted po | rtion | | | |
| | | 0.90m dia manholes(3.14/4*0.9*0.9 *0.2) | 750 | 0.64 | | 0.2 | 95.38 | | | |
| | | *0.2) 1.20m dia manholes(3.14/4*1.2*1.2 *.25) | 79 | 1.13 | | 0.25 | 22.33 | | | |
| | | 1.50m dia manholes (3.14/4*1.5*1.5*0.3) | 271 | 1.77 | | 0.3 | 143.60 | | | |
| | | Deductions | | | | | | | | |
| | | 0.90m dia hole -pipe portion((3.14/4*0.15*0.15)*1/3*0.9) | 750 | 0.0176625 | | 0.3 | -3.97 | | | |

| | | Say | | 34045.9776 | bags | | a | Rs | 70.77 | 2409263.0 |
|---|-----------------|---|----------|-------------------------------|----------------|----------------|------------------|-------------------|---------------------|---|
| 4 | | Total | | a 40 t = 1 | | | | - | 1702298.882 | - |
| | | Quantity of Concrete | 1 | | 5006.76 | m ³ | 340 | kg/m ³ | 1702298.882 | - |
| | 4.12 | Extra for providing and m specification. | ixing wa | ater proofing | | | | - | - | - |
| | 01 | Say | | 550743.756 | kg | | a | Rs | 104.91 | 57778114. |
| | | Total | | | | | | | 550743.7558 | - |
| | 5.2 | upto plinth level. Thermo-M Quantity of Concrete | | | | Fe-500D or | more. | kg/m ³ | 550743.7558 | kg |
| ┫ | 5.22.6+od 16 | Epoxy coated steel reinforc | | or R.C.C. wor | k including | | | 0 | 1 · | |
| ┥ | | Say | | 1951.81 | m ³ | | 1751.01 | @Rs | 8,932.67 | ₹ 17,434,898. |
| + | | | | | | | -7.13 1951.81 | | | |
| | | 150mm dia pipes (2*3.14/4*0.15*0.15*0.2) (942 Nos) | 1884 | 0.0176625 | | 0.2 | -6.66 | | | |
| | | 150mm dia pipes(3*3.14/4*0.15*0.15 *0.2) *0.2) (45Nos) (intersection joints) 150mm | 135 | 0.0176625 | | 0.2 | -0.48 | | | |
| | | Deducti | on- Mai | n hole pipe po | rtions | | | | | |
| 1 | | Total | | | | | 1944.68 | m ³ | | |
| | | 1.50m dia manhole - side wall- steining total(3.14/4*(1.9*1.9- 1.5*1.5) * total ht of manholes | 1 | 1.0676 | | 1109.68 | 1184.69 | | | zone 283.49,zone 225.99, zone 138.51,zone 246.75,zone |
| | | 1.2m dia manhole - side wall- steining total(3.14/4*(1.6*1.60- 1.2*1.20) * total ht of manholes | 1 | 0.8792 | | 155.81 | 136.99 | | | Zone1-33.39,zon 21.48,zone 33.57,zone 39.79,zone5-27.3 |
| | | 0.90m dia manhole - side wall - steining total(3.14/4*(1.3*1.3- 0.9*0.9) * total ht of manholes | 1 | 0.6908 | | 901.85 | 623.00 | m ³ | | (zone1-248.7,zon 154.26,zone 160.82,zone 165.09,zone 172. |
| , | 2 | (1 cement : 1.5 coarse sand | | | | · | | ittering, ini | isining and remitor | centent, with 1.1. |
| 9 | 5.7 | Say Reinforced cement concrete | - work i | 190.012309 n well - steini | | the cost of a | entering shu | @Rs | 8,340.93 | ₹ 1,584,879. |
| _ | | Total | | | 2 | | 190.01 | m ³ | | |
| | | Channel portion 1.5*(1.50+0.15)/2*0.15 | 271 | 1.2 | 0.825 | 0.15 | -40.24 | | | |
| | | 1.500m dia hole -pipe portion((3.14/4*0.15*0.15)*1/3*1.5) | 271 | 0.0176625 | | 0.5 | -2.39 | | | |
| | | Channel portion 1.2*(1.20+0.15)/2*0.1 | 79 | 1.2 | 0.675 | 0.1 | -6.40 | | | |
| | | 1.200m dia hole -pipe portion((3.14/4*0.15*0.15)*1/3*1.2) | 79 | 0.0176625 | | 0.4 | -0.56 | | | |

| | 0.90m dia manholes -mat | 750 | 6 | | 0.35 | 1575 | m ² | | |
|------------|--|--|---|---|---|---|---|--|--|
| | 1.20m dia manholes -mat | 79 | 7.2 | | 0.4 | 227.52 | | | |
| | 1.50m dia manholes -mat | 271 | 8.4 | | 0.45 | 1024.38 | | | |
| | Sewer chamber -mat | 2200 | 4 | | 0.2 | 1760 | | | |
| | Total | | | | | 4586.9 | m ² | | |
| | Say | | 4586.9 | m ² | | | @Rs | 350.00 | ₹ 1,605,415.0 |
| ∞ 5.9.2 | Centering and shuttering in butteresses, plinth and strir | - | | opping etc. a | and removal o | of form for :W | Valls (any | thickness) includin | g attached pilaste |
| | 0.90m dia 750 manholes - walls | 1 | 6.91 | | 901.85 | 6229.98 | m ² | | |
| | 1.20m 79 dia manholes - walls | 1 | 8.79 | | 136.99 | 1204.40 | | | |
| | 1.50m dia 271 manholes - walls | 1 | 10.68 | | 1184.69 | 12647.80 | | | |
| | Sewer chamber -outside | 2200 | 4.00 | | 0.50 | 4400.00 | | | |
| | Sewer chamber -inside | 2200 | 3.60 | | 0.50 | 3960.00 | | | |
| | Total | | | | | 28442.18 | | | |
| 22.23.1 | Say | | 28442.1767 | m^2 | | <i>a</i> | Rs | 748.62 | 21292465 |
| | retaining walls of the base bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 909 side. The crystalline slurry as per specification and the leakage. For vertical surfac | by mixin slurry : The mate & compa shall be e directio | ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng | o of 5 : 2 (5) for horizont et the requin trol concret elf-healing of ineer-in-chai | parts integral tal surfaces an rements as sp te as per DIN f cracks up to | crystalline slu d applying th ecified in AC 1048 and res a width of 0. | urry : 2 pai e same fro CI 212-3R- sistant to 1 50mm. Th | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carn | al surfaces and 3 : l) side with the he sing permeability of pressure on negativ- ried out all comple |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 909 side. The crystalline slurry as per specification and the leakage. For vertical surfac 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls | by mixin slurry : The mate & compa shall be e directio | ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng | o of 5 : 2 (5) for horizont et the requin trol concret elf-healing of ineer-in-chai | parts integral tal surfaces an rements as sp te as per DIN f cracks up to | crystalline slu d applying th ecified in AC 1048 and res a width of 0. | urry : 2 pai e same fro CI 212-3R- sistant to 1 50mm. Th | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carn | al surfaces and 3 : l) side with the he sing permeability of pressure on negativ- ried out all comple |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 90% side. The crystalline slurry as per specification and the leakage. For vertical surfac 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - | by mixin slurry : The mate & compa shall be e direction the two co 1 | ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng pats @ 0.70 k 2.83 | o of 5 : 2 (5) for horizont et the requin trol concret elf-healing of ineer-in-chai | parts integral tal surfaces an rements as spi te as per DIN f cracks up to rge. The prod 901.85 | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 | rrry : 2 pan e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carn | al surfaces and 3 : l) side with the he sing permeability of pressure on negativ- ried out all comple |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 90% side. The crystalline slurry as per specification and the leakage. For vertical surfac 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls 1.50m dia 271 manholes - | by mixin slurry : 'he mate % compa shall be e directione two coon 1 | ng in the ratio 1 part water) rial shall me ared with corr capable of se on of the eng pats @ 0.70 k 2.83 3.77 | o of 5 : 2 (5) for horizont et the requin trol concret elf-healing of ineer-in-chai | parts integral tal surfaces an rements as spi te as per DIN f cracks up to rge. The prod 901.85 155.81 | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 587.09 5226.59 3960.00 | mry : 2 pai e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carn | al surfaces and 3 : l) side with the he sing permeability pressure on negativation ried out all completion |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 90% side. The crystalline slurry as per specification and the leakage. For vertical surfac 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls 1.50m dia 271 manholes - walls | by mixin slurry : 'he mate % compa shall be e direction two co 1 1 1 | ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng bats @ 0.70 k 2.83 3.77 4.71 3.60 | o of 5 : 2 (5) for horizont et the requin throl concret off-healing of ineer-in-chain g per sqm | parts integral tal surfaces an rements as spire e as per DIN f cracks up to rge. The prod 901.85 155.81 1109.68 | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 587.09 5226.59 | mry : 2 pai e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carn | al surfaces and 3 : il) side with the he cing permeability pressure on negati- ried out all completion |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 909 side. The crystalline slurry as per specification and the leakage. For vertical surface 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls Sewer chamber -inside Total Say Providing and applying in | by mixin slurry : The mate & compa shall be e direction e two co 1 1 1 2200 mtegral c | ng in the ratio I part water) rial shall me ared with cor capable of se on of the eng pats @ 0.70 k 2.83 3.77 4.71 3.60 12322.313 | o of 5 : 2 (5) for horizont et the requin trol concret lf-healing of ineer-in-chain g per sqm | parts integral tal surfaces an rements as spi te as per DIN f cracks up to rge. The prod 901.85 155.81 1109.68 0.50 | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 587.09 5226.59 3960.00 12322.31 @ ture for wate | mry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² m ² Rs | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carn arry guarantee for 595.28 treatment to the I | al surfaces and 3 il) side with the he sing permeability pressure on negati ried out all comple 10 years against a 7335167. RCC structures li |
| 22.23.2 | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 909 side. The crystalline slurry as per specification and the leakage. For vertical surfac 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls 1.50m dia 271 manholes - walls Sewer chamber -inside Total Say Providing and applying in retaining walls of the bass bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 909 side. The crystalline slurry as per specification and the | by mixin slurry : 'he mate % compa shall be e direction e two con 1 1 1 2200 thegral c ement, w by mixin slurry : 'he mate % compa shall be e direction | ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng pats @ 0.70 k 2.83 3.77 4.71 3.60 12322.313 rrystalline slu vater tanks, n ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng | o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chain g per sqm m ² mry of hydr coof slabs, p o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chaing of | parts integral tal surfaces an rements as spite as per DIN f cracks up to rge. The prod 901.85 155.81 1109.68 0.50 cophilic in na bodiums, reserved parts integral tal surfaces an rements as spite a sper DIN f cracks up to | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 587.09 5226.59 3960.00 12322.31 @ ture for wate rvior, sewage crystalline slu d applying th ecified in AC 1048 and res a width of 0. | rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² m ² Rs erproofing = & water rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr arry guarantee for 595.28 treatment to the I treatment plant, tu ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr | al surfaces and 3 al) side with the he sing permeability pressure on negati- ried out all comple 10 years against a 7335167. RCC structures linnels / subway a al surfaces and 3 al) side with the he sing permeability pressure on negati- ried out all comple |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 90% side. The crystalline slurry as per specification and the leakage. For vertical surface 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls 1.50m dia 271 manholes - walls Sewer chamber -inside Total Say Providing and applying in retaining walls of the base bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 90% side. The crystalline slurry as per specification and the per specification and the concrete symmetric slurry as per specification and the | by mixin slurry : The mate compa shall be e direction te two coordinates in the shall be e direction the mate compa shall be e direction face one | ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng pats @ 0.70 k 2.83 3.77 4.71 3.60 12322.313 rystalline slut vater tanks, n ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng coat @1.10 h | o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chain g per sqm m ² mry of hydr coof slabs, p o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chaing of | parts integral tal surfaces an rements as spite as per DIN f cracks up to rge. The prod 901.85 155.81 1109.68 0.50 cophilic in na bodiums, reserved parts integral tal surfaces an rements as spite a sper DIN f cracks up to | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 587.09 5226.59 3960.00 12322.31 @ ture for wate crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan | rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² m ² m ² Rs erproofing a & water rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr arry guarantee for 595.28 treatment to the I treatment plant, tu ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr | al surfaces and 3 : il) side with the he sing permeability pressure on negati- ried out all comple- 10 years against an 7335167.0 RCC structures li- nnels / subway and al surfaces and 3 : il) side with the he sing permeability pressure on negati- ried out all comple- |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 909 side. The crystalline slurry as per specification and the leakage. For vertical surfac 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls 1.50m dia 271 manholes - walls Sewer chamber -inside Total Say Providing and applying in retaining walls of the bass bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 909 side. The crystalline slurry as per specification and the leakage. For horizontal sur 0.90m dia manholes -mat 1.20m dia manholes -mat | by mixin slurry : The mate compasion shall be e direction e two con- l 1 1 2200 ntegral c ement, w by mixin slurry : The mate compasion shall be e direction face one 750 79 271 | ng in the ratio I part water) rial shall me ared with cor capable of se on of the eng pats @ 0.70 k 2.83 3.77 4.71 3.60 12322.313 rrystalline slu vater tanks, r ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng coat @1.10 l 2.826 3.768 4.71 | o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chain g per sqm m ² mry of hydr coof slabs, p o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chaing of | parts integral tal surfaces an rements as spite as per DIN f cracks up to rge. The prod 901.85 155.81 1109.68 0.50 cophilic in na bodiums, reserved parts integral tal surfaces an rements as spite a sper DIN f cracks up to | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 587.09 5226.59 3960.00 12322.31 @ ture for wate vior, sewage crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2119.5 297.672 1276.41 | rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² Rs erproofing e & water rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr arry guarantee for 595.28 treatment to the I treatment plant, tu ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr | al surfaces and 3 : l) side with the he sing permeability pressure on negati- ried out all comple 10 years against an 7335167.0 RCC structures lift nnels / subway and al surfaces and 3 : l) side with the he sing permeability pressure on negati- ried out all comple |
| | bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 90% side. The crystalline slurry as per specification and the leakage. For vertical surfac 0.90m dia 750 manholes - walls 1.20m 79 dia manholes - walls 1.50m dia 271 manholes - walls Sewer chamber -inside Total Say Providing and applying in retaining walls of the bass bridge deck etc., prepared (3 parts integral crystalline of synthetic fiber brush. T concrete by more than 90% side. The crystalline slurry as per specification and the leakage. For horizontal sur 0.90m dia manholes -mat 1.20m dia manholes -mat | by mixin slurry : 'he mate % compa shall be e direction tegral c ement, w by mixin slurry : 'he mate % compa shall be e direction face one 750 79 | ng in the ratio I part water) rial shall me ared with cor capable of se on of the eng pats @ 0.70 k 2.83 3.77 4.71 3.60 12322.313 erystalline slu vater tanks, r ng in the ratio 1 part water) rial shall me ared with cor capable of se on of the eng coat @1.10 l 2.826 3.768 | o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chain g per sqm m ² mry of hydr coof slabs, p o of 5 : 2 (5) for horizont et the requin trol concret et f-healing of ineer-in-chaing of | parts integral tal surfaces an rements as spite as per DIN f cracks up to rge. The prod 901.85 155.81 1109.68 0.50 cophilic in na bodiums, reserved parts integral tal surfaces an rements as spite a sper DIN f cracks up to | crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2548.63 587.09 5226.59 3960.00 12322.31 @ ture for wate crystalline slu d applying th ecified in AC 1048 and res a width of 0. uct performan 2119.5 297.672 | rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² m ² Rs erproofing e & water rry : 2 par e same fro CI 212-3R- sistant to 1 50mm. Th nce shall c m ² m ² m ² m ² m ³ m ⁴ m ² m ⁴ m ² m ² m ⁴ m ² m ² m ⁴ m ² m ⁴ m ⁴ m ² m ⁴ m ² m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ m ⁴ | ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr arry guarantee for 595.28 treatment to the I treatment plant, tu ts water) for vertic m negative (interna -2010 i.e by reduc 6 bar hydrostatic p e work shall be carr | al surfaces and 3 : il) side with the he sing permeability pressure on negati- ried out all comple- 10 years against an 7335167.0 RCC structures li- nnels / subway and al surfaces and 3 : il) side with the he sing permeability pressure on negati- ried out all comple- |

| | Say | | 4485.582 | m | | a | Rs | 458.77 | 2057848.1 |
|---------|---|---|--|--|---|--|--|---|---|
| 13.7.1 | 12 mm cement plaster finis | shed with | n a floating co | at of neat | cement :1:3 (1 | cement : 3 fir | e sand) | | |
| | 0.90m dia 750 manholes - walls | 1 | 2.83 | | 901.85 | 2548.63 | | | |
| | 1.20m 79 dia manholes - walls | 1 | 3.77 | | 155.81 | 587.09 | m ² | | |
| | 1.50m dia 271 manholes - walls | 1 | 4.71 | | 1109.68 | 5226.59 | m ² | | |
| | Sewer chamber -inside | 2200 | 3.60 | | 0.50 | 3960.00 | m ² | | |
| | 0.90m dia manholes -mat | 750 | 2.826 | | | 2119.5 | | | |
| | 1.20m dia manholes -mat | 79 | 3.768 | | | 297.672 | m ² | | |
| | 1.50m dia manholes -mat | 271 | 4.71 | | | 1276.41 | m ² | | |
| | Sewer chamber -mat | 2200 | 0.36 | | | 792 | m ² | | |
| | Total | | | | | 16807.89 | m ² | | |
| | Say | | 16807.89 | m^2 | | | Rs | 418.79 | 7038932. |
| 19.18.1 | Supplying and fixing C.I. of be not less than 23 kg 0.90m dia manholes | cover wi 750 | thout frame for | or manhole | es :455x610 mr | - | C.I. cover | (light duty) the we | ight of the cover |
| | 1.20m dia manholes - | 79 | | | | 79 | No | | |
| | 1.50m dia manholes | 271 | | | | 271 | No | | |
| | Sewer chamber | 2200 | | | | 2200 | No | | |
| | Total | | | | | 3300.00 | - | | |
| | - | | 3300.00 | No | | <i>a</i> | Rs | 1629.51 | 5377368. |
| 4 91.61 | Say Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 | ving min ace betw tions on ification | ot rest of mi nimum cross s veen protruded tail length on s and having | ection as 2 d legs havi 138 mm a manufactu | 3 mm x 25 mr ng 2 mm tread s per standard ures permanent | n and over al on top surfac drawing and identificatio | l minimum e by ribbir suitable to n mark to | length 263 mm and og or chequering ber with stand the ben be visible even aft | d width as 165 m sides necessary as d test and chemic er fixing includis |
| 4 91.61 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec | ving min ace betw tions on ification 0x20x15 | ot rest of mi nimum cross s veen protruded tail length on s and having | ection as 2 d legs havi 138 mm a manufactu | 3 mm x 25 mr ng 2 mm tread s per standard ures permanent | n and over al on top surfac drawing and identificatio | l minimum e by ribbir suitable to n mark to | length 263 mm and og or chequering ber with stand the ben be visible even aft | d width as 165 n sides necessary a d test and chemic er fixing includi |
| 4 91.61 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 | ving min ace betw tions on ification 0x20x15 | ot rest of mi nimum cross s veen protruded tail length on s and having | ection as 2 d legs havi 138 mm a manufactu | 3 mm x 25 mr ng 2 mm tread s per standard ures permanent | n and over al on top surfac drawing and identificatio | l minimum e by ribbir suitable to n mark to | length 263 mm and og or chequering ber with stand the ben be visible even aft | d width as 165 n sides necessary a d test and chemic er fixing includi |
| 4 91.6 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig | ving min ace betw tions on ification 0x20x15 gn. | ot rest of mi nimum cross s veen protruded tail length on s and having cm cement co | ection as 2 d legs havi 138 mm a manufactu | 3 mm x 25 mr ng 2 mm tread s per standard ures permanent | n and over al on top surfac drawing and identificatio nent: 3 coars | l minimum ee by ribbir suitable to n mark to e sand: 6 g | length 263 mm and og or chequering ber with stand the ben be visible even aft | d width as 165 n sides necessary a d test and chemic er fixing includi |
| 4 91.61 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes | ving min ace betw tions on ification 0x20x15 gn. | ot rest of mi nimum cross s veen protruded tail length on s and having cm cement co 1804 | ection as 2 d legs havi 138 mm a manufactu | 3 mm x 25 mr ng 2 mm tread s per standard ures permanent | n and over al on top surfac drawing and identificatio nent: 3 coars 1803.7 | l minimum ee by ribbir suitable to n mark to e sand: 6 g | length 263 mm and og or chequering ber with stand the ben be visible even aft | d width as 165 n sides necessary a d test and chemic er fixing includi |
| 4 9:6 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes - 1.50m dia manholes Total | ving mir ace betw tions on ification 0x20x15 gn. 1 1 | interpretation of the second state of the seco | ection as 2 d legs havi 138 mm a manufactu oncrete blo | 3 mm x 25 mr ng 2 mm tread s per standard ures permanent | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 | I minimum e by ribbir suitable to n mark to e sand: 6 g | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggrega | d width as 165 n sides necessary a d test and chemi- er fixing includi ate 20 mm nomin |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes - 1.50m dia manholes | ving mir ace betw tions on ification)x20x15 gn. 1 1 1 1 1 | interference of the second sec | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat | I minimum te by ribbir suitable to n mark to e sand: 6 g No Mo @Rs ions etc. in | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite | ving mir ace betw tions on ification)x20x15 gn. 1 1 1 1 1 | interfective in | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated | ving mir ace betw tions on ification)x20x15 gn. 1 1 1 earth (e ed layer | interference of the second sec | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat | I minimum te by ribbir suitable to n mark to e sand: 6 g No Mo @Rs ions etc. in | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.20m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation | ving mir ace betw tions on ification)x20x15 gn. 1 1 1 earth (e ed layer | interfective in | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions | ving mir ace betw tions on ification)x20x15 gn. 1 1 1 earth (e ed layer | oot rest of minimum cross s veen protruded tail length on s and having cm cement co 1804 312 2219 4335 excluding rock by ramming a 20654.53 | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc | ving mir ace betw tions on ification)x20x15 gn. 1 1 1 earth (e ed layer | oot rest of mi imum cross s veen protrudect tail length on s and having cm cement co 1804 312 2219 4335 excluding rock by ramming a 20654.53 1146.88 | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 3 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 earth (e ed layer 1 1 | ot rest of mi inium cross s veen protrudec tail length on s and having cm cement co 1804 312 2219 4335 excluding rocl by ramming a 20654.53 1146.88 4485.58 | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 4485.58 | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 3 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 earth (e ed layer 1 1 1 1 | intermediate | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer nes, plinth, side g, lead up to 50 901.85 | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 4485.58 1196.44 | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 3 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 earth (e ed layer 1 1 1 1 1 1 | intermediate | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer nes, plinth, sid- g, lead up to 50 901.85 155.81 | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 4485.58 1196.44 353.48 | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab Manhole | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 earth (e ed layer 1 1 1 1 1 1 | intermediate | ection as 2 d legs havi 138 mm a manufactu oncrete blo No No | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer nes, plinth, sid- g, lead up to 50 901.85 155.81 | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 4485.58 1196.44 353.48 4216.12 | I minimum be by ribbir suitable to n mark to e sand: 6 g No No @Rs ions etc. in p to 1.5 m. | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemii er fixing includi ate 20 mm nomii |
| | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab Manhole Total deductions | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 earth (e ed layer 1 1 1 1 1 1 | intermediate | ection as 2 d legs havi 138 mm a manufactu oncrete blo No x) in trenct nd waterin | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer nes, plinth, sid- g, lead up to 50 901.85 155.81 | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 4485.58 1196.44 353.48 4216.12 11398.50 | I minimum te by ribbir suitable to n mark to e sand: 6 g No @Rs ions etc. in p to 1.5 m. m ³ | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggregation 568.88 hayers not exceedi | d width as 165 n sides necessary a d test and chemie er fixing includi ate 20 mm nomin ₹ 2,466,095. ng 20 cm in dep |
| 2.25 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab Manhole Total deductions Total less deduction | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 cearth (e ed layer 1 1 1 1 1 1 1 | ot rest of minimum cross s imum cross s ieen protrudect tail length on s and having cm cement co 1804 312 2219 4335 excluding rocl by ramming a 20654.53 1146.88 4485.58 1.33 2.27 3.80 9256.02865 d chambers | ection as 2 d legs havi 138 mm a manufactu oncrete blo No x) in trenct nd waterin | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer nes, plinth, sid- g, lead up to 50 901.85 155.81 | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 cs of foundat 0 m and lift u 20654.53 1146.88 4485.58 1196.44 353.48 4216.12 11398.50 9256.03 | I minimum be by ribbir suitable to n mark to e sand: 6 g No @Rs ions etc. in p to 1.5 m. m ³ m ³ @Rs | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggrega 568.88 h layers not exceedi | d width as 165 m sides necessary a d test and chemic er fixing includi ate 20 mm nomin ₹ 2,466,095. ng 20 cm in dep |
| 2.25 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.20m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab Manhole Total deductions Total less deduction Say Taking connection for man | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 cearth (e ed layer 1 1 1 1 1 1 1 | ot rest of mi nimum cross s veen protrudeot tail length on s and having cm cement co 1804 312 2219 4335 excluding rock by ramming a 20654.53 1146.88 4485.58 1.33 2.27 3.80 9256.02865 | ection as 2 d legs havi 138 mm a manufactu oncrete blo No x) in trenct nd waterin | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer nes, plinth, sid- g, lead up to 50 901.85 155.81 | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 4485.58 1196.44 353.48 4216.12 11398.50 9256.03 6650 | I minimum be by ribbin suitable to n mark to e sand: 6 g No @Rs ions etc. in p to 1.5 m. m ³ @Rs m ³ @Rs | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggrega 568.88 h layers not exceedi | d width as 165 m sides necessary a d test and chemic er fixing includi ate 20 mm nomir ₹ 2,466,095. ng 20 cm in dep |
| 2.25 | Providing orange colour s conforming to IS:1786, ha with minimum 112 mm sp adequate anchoring project resistance test as per spec fixing in manholes with 30 size) Complete as per desig 0.90m dia manholes 1.20m dia manholes 1.50m dia manholes Total Say Filling available excavated consolidating each deposite qty same as excavation deductions pcc base slab Manhole Total deductions Total less deduction | ving mir ace betw tions on ification 0x20x15 gn. 1 1 1 cearth (e ed layer 1 1 1 1 1 1 1 | ot rest of minimum cross s imum cross s ieen protrudect tail length on s and having cm cement co 1804 312 2219 4335 excluding rocl by ramming a 20654.53 1146.88 4485.58 1.33 2.27 3.80 9256.02865 d chambers | ection as 2 d legs havi 138 mm a manufactu oncrete blo No x) in trencl nd waterin m ³ | 3 mm x 25 mr ng 2 mm tread s per standard tres permanent ck 1:3:6 (1cer nes, plinth, sid- g, lead up to 50 901.85 155.81 | n and over al on top surfac drawing and identification nent: 3 coars 1803.7 311.62 2219.36 4334.68 es of foundat 0 m and lift u 20654.53 1146.88 4485.58 1196.44 353.48 4216.12 11398.50 9256.03 6650 6650 | I minimum be by ribbir suitable to n mark to e sand: 6 g No @Rs ions etc. in p to 1.5 m. m ³ m ³ @Rs | length 263 mm an- ag or chequering be- with stand the ben be visible even aft raded stone aggrega 568.88 h layers not exceedi | d width as 165 m sides necessary a d test and chemic er fixing includi ate 20 mm nomir |

| Т | | Total volume | 1 | 27000.00 | 0.80 | 0.40 | 8640.00 | m ³ | | |
|-----------|-----------|--|----------|----------------|----------------|------------|---------------|----------------|----------|-----------------|
| | | Deduction | | | | | | | | |
| | | | 1 | 27000.00 | 0.04 | | 1025.84 | | | |
| | | | | 1616.30 | 0.04 | | 61.41 | | | |
| | | Total deduction | | | | | 1087.25 | | | |
| | | Total less deduction | | | | | 7552.75 | | | |
| \square | | Say | r | 7552.75 | m ³ | | | @Rs | 370.74 | ₹ 2,800,107.00 |
| 41 | 50.2.25.1 | Filling with contractor's or consolidating each deposit charge | ed layer | by ramming | and watering | | 50 m and lift | up to 1.5 | | |
| | | Total volume(80 % of e | we qty c | of medium to h | nard rock) | | 32504 | | | |
| | | Total | | | | | 32504 | m ³ | | |
| | | Say | r | 32504 | m ³ | CI | 35.59 | @Rs | 548.85 | ₹ 24,189,012.00 |
| | | | T | TOTAL FOR | R NETWO | RK | | | 453 | 9,772,218.50 |
| | | | | Road | restoratio | on charges | 5 | | | |
| 1 | | Shoulder cutting | | | | | - | | | |
| | | | 2200 | 1.1 | 1.1 | | 2662 | | | |
| | | | | | | | | @Rs | 1,366.76 | ₹ 3,638,315.12 |
| 2 | | Concrete road | | | | | | | | |
| | | Pipe | 1 | 8221.8 | 1.5 | | 12332.7 | | | |
| | | Mamhole | 330 | 2 | 1.5 | | 990 | | | |
| | | | | | | | 13322.7 | | | |
| | | Say | | 13322.7 | m ² | | | @Rs | 4,887.00 | ₹ 65,108,035.00 |
| 3 | | Tar road surface restoratio | n charge | es | | | | | | |
| | | | 1 | 10962.4 | 1.5 | | 16443.6 | | | |
| | | Mamhole | 440 | 2 | 1.5 | | 1320 | | | |
| | | | | | | | 17763.6 | | | |
| | | Say | | 17763.6 | m ³ | | | @Rs | 3,086.87 | ₹ 54,833,924.00 |
| 4 | | BM & BC road surface res | 1 | | | | · · · · · | | 1 | |
| <u> </u> | | | 1 | 8221.8 | 1.5 | | 12332.7 | | | |
| Ì | | | | | | | 1000 | | 1 | |
| | | | 440 | 2 | 1.5 | | 1320 | | - | |
| | | Say | | 2 13652.7 | 1.5 | | 1320 | (a) | 3,633.46 | ₹ 49,606,539.00 |

| | | | DET | CAILED ES | STIMA | TE | | | | |
|----------------|-----------|---|----------|-----------------|-----------------------|---------------------|------------------------|-------------------|---------------|------------|
| | | SEWERAGE SC | HEM | E IN KAT | TAPA | NA M | UNICI | PAL | ITY | |
| | | RUCTION -COLLECTI | ON V | VELLS | | | | | | |
| CO | LLECTION | WELL -2 | | | | | | | | - |
| Ite m No | Item Code | Description | No | L | В | Н | V | Unit | Rate | Amount |
| • | | Earthwork open well excavation | | | | | • | | | Amount |
| 1 | 100 | all kinds of soil and conveying 1.5 m including neat banking. 1092 Collection well 2 | g and de | epositing the s | poil with ed based | in initia on PHE | al lead of ED SDB · | 50m a - Item 1 | nd lift up to | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 71.5 | m ³ | | | | | |
| | 100.3.5.1 | Do for item 4All kinds of soil | 30% | 71.5 | | | 21.45 | @Rs | 490.76 | ₹ 10,527.0 |
| | 100.3.6.1 | Do for item 4Ordinay rock | 30% | 71.5 | | | 21.45 | @Rs | 1,241.08 | ₹ 26,621.0 |
| | OD MR-B1 | | 5% | 71.5 | | | 3.58 | @Rs | 1,537.37 | ₹ 5,496.0 |
| | OD MR-NB1 | | 15% | 71.5 | | | 10.73 | @Rs | 2,063.83 | ₹ 22,135.0 |
| | OD HR-B1 | | 5% | 71.5 | | | 3.58 | @Rs | 2,021.27 | ₹ 7,226.0 |
| 2 | OD HR-NB1 | Earthwork open well excavation | 15% | 71.5 | | | 10.73 | | 2,992.67 | ₹ 32,096.0 |
| | 100 | all kinds of soil and conveying 1.5m to 3.0 m including neat b Collection well 2 Inlet chamber | | | 6.2 2.25 | 1.5 0.65 | 57.66 6.00 | 50m a | nd lift from | |
| | | Say | | 63.66 | m ³ | | | | | |
| | 100.3.5.2 | Do for item 4All kinds of soil | 30% | 63.66 | | | 19.10 | @Rs | 539.87 | ₹ 10,310.0 |
| | 100.3.6.2 | Do for item 4Ordinay rock | 30% | 63.66 | | | 19.10 | @Rs | 1,365.20 | ₹ 26,073.0 |
| | OD MR-B2 | | 5% | 63.66 | | | 3.18 | @Rs | 1,691.11 | ₹ 5,383.0 |
| | OD MR-NB2 | | 15% | 63.66 | | | 9.55 | @Rs | 2,270.24 | ₹ 21,679.0 |
| | OD HR-B2 | | 5% | 63.66 | | | 3.18 | @Rs | 2,223.42 | ₹ 7,077.0 |
| | OD HR-NB2 | | 15% | 63.66 | | | 9.55 | @Rs | 3,291.96 | ₹ 31,435.0 |
| 3 | 100 | Earthwork open well excavational kinds of soil and conveying 3.0m to 4.5 m including neat b | g and de | epositing the s | | | | | | |
| | | Collection well 2 | 1 | 6.2 | | 1.5 | 57.66 | | | |
| | | Say | | 57.66 | m ³ | | | | | |
| | 100.3.5.3 | Do for item 4All kinds of soil | 30% | 57.66 | | | 17.30 | @Rs | 588.91 | ₹ 10,187.0 |
| | 100.3.6.3 | Do for item 4Ordinay rock | 30% | 57.66 | | | 17.30 | @Rs | 1,489.32 | ₹ 25,762.0 |
| | OD MR-B3 | | 5% | 57.66 | | | 2.88 | @Rs | 1,844.89 | ₹ 5,319.0 |
| | OD MR-NB3 | | 15% | 57.66 | | | 8.65 | @Rs | 2,476.65 | ₹ 21,421.0 |
| | OD HR-B3 | | 5% | 57.66 | | | 2.88 | @Rs | 2,425.58 | ₹ 6,993.0 |

| | OD HR-NB3 | | 15% | 57.66 | | | 8.65 | @Rs | 3,591.27 | ₹ 31,061.0 |
|---|-----------|--|---|---|---|---|--|--|---|--------------------|
| 4 | 100 | Earthwork open well excavation all kinds of soil and conveying 4.5m to 6.0 m including neat b | g and de | positing the s | | | | ~ | | |
| | | Collection well 2 | 1 | 6.2 | 6.2 | 0.15 | 5.77 | | | |
| | | Say | | 5.77 | m ³ | | | | | |
| | 100.3.5.4 | Do for item 4All kinds of soil | 30% | 5.77 | | | 1.73 | @Rs | 638.02 | ₹ 1,104.0 |
| | 100.3.6.4 | Do for item 4Ordinay rock | 30% | 5.77 | | | 1.73 | @Rs | 1,613.37 | ₹ 2,793.0 |
| | OD MR-B4 | | 5% | 5.77 | | | 0.29 | @Rs | 1,998.55 | ₹ 577.0 |
| | OD MR-NB4 | | 15% | 5.77 | | | 0.87 | @Rs | 2,682.94 | ₹ 2 <i>,</i> 322.0 |
| | OD HR-B4 | | 5% | 5.77 | | | 0.29 | @Rs | 2,627.62 | ₹ 758.0 |
| | OD HR-NB4 | | 15% | 5.77 | | | 0.87 | @Rs | 3,890.39 | ₹ 3,367.0 |
| 6 | 4.1.6 | Providing and laying in position centering and shuttering - All III): 6 graded stone aggregate | work up | to plinth lev nominal size) | el : 1:3:6 | (1 Cem | ent : 3 co | | | |
| | | Collection well 2 | 1 | 6.2 | 6.2 | 0.2 | 7.69 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.15 | 0.2 | 1.76 | | | |
| | | Total | | | | | 9.45 | m ³ | | |
| | | Say | | 9.45 | m ³ | | @ | Rs | 7527.0608 | 71130.72 |
| | | Providing and laying in position concrete work, using Sulphate manufactured in fully automat for all leads, having continuous grade for reinforced cement con- site of laying, excluding the co- including cost of admixtures in setting of concrete, improve we direction of the Engineer-in-ch kg/ ³ .Excess/less cement used a | e Resist ic batch is agitat oncrete ost of con n recom orkabil narge. (1 | ant Cement (ing plant and ed mixer, mar work, includir entering, shut mended prop- ity without im Note :- Cemer | (SRC) co transport nufactured ng pumpit tering fin ortions as apairing so nt content | ntent as ted to si d as per ng of R ishing a s per IS trength t consid | te of wor mix des .M.C. fro and reinfo : 9103 to and dura ered in th | roved c ign of s om tran orceme o accele bility a nis iten | lesign mix, ansit mixer specified sit mixer to nt, erate/ retard is per | |
| | | Collection well 2 | is per u | esign niix is p | ayabie/ie | coverat | ne separa | itery). | | |
| | | Bottom slab(3.14/4*(4.6+0.6+.3)^2* 0.3 | 1 | 23.75 | | 0.3 | 7.12 | m ³ | | |
| | | wall(3.14/4*(5.2^2- 4.6^2))*H | 1 | 4.62 | 0.30 | 4.15 | 5.75 | | | |
| | | Inlet chamber bottom slab | 1 | 3.95 | 1.85 | 0.2 | 1.46 | | | |
| | | T 1 . 1 1 11 | 2 | 3.70 | 3.15 | 0.2 | 4.66 | m ³ | | |
| | | Inlet chamber wall | 2 | 5.70 | 5.15 | 0.2 | 4.00 | | | |
| | | Inlet chamber wall Inlet chamber wall | 2 | 1.25 | 3.15 | | 1.58 | | | |
| | | | | | 3.15 | | | m ³ | | |

| | | Providing and laying in position concrete work, using cement c automatic batching plant and t continuous agitated mixer, ma cement concrete work, includi | content a transport nufactur ng pumj | as per approve ted to site of v red as per mix ping of R.M.C | ed design work in ti k design c C. from tr | mix, m ransit m of speciar ransit m | anufactu ixer for a fied grad ixer to si | red in f all lead e for re te of la | fully s, having sinforced sying , | |
|--------|------------|---|---|---|---|--|---|--|--|-----------|
| | | excluding the cost of centering admixtures in recommended p concrete, improve workability Engineer-in-charge. (Note :- C | roportio without | ons as per IS : t impairing str | 9103 to a prength an | accelera d durab | ate/ retard vility as p | d settin er dired | g of | |
| 8 5. | 37.1 | cum.Excess/less cement used a | | | | | <u> </u> | - | | |
| | | wall(3.14/4*(5.2^2- | | | | | | | | |
| | | 4.6^2))*H | 1 | 4.62 | 0.30 | 1.00 | 1.38 | m ³ | | |
| | | Top slab incl.cantilever beam(3.14/4*(4.6+0.6+2)^2* 0.2 | 1 | 40.69 | | 0.2 | 8.14 | m ³ | | |
| | | Main beam | 2 | 4.60 | | 0.3 | 2.76 | m3 | | |
| | | Inlet chamber top slab | 1 | 2.80 | 1.85 | | 0.56 | | | |
| | | Total | 1 | 2.00 | 1.05 | 0.2 | 12.84 | | | |
| | | Deduction | | | | | 12.04 | *** | | |
| | | Manhole | 4 | 0.6 | 0.45 | 0.2 | 0.22 | m ³ | | |
| | | Total | 4 | 0.0 | 0.43 | 0.2 | 0.22 | | | |
| | | | | | | | 12.62 | | | |
| | | Total after deduction | | 10 (0 | 3 | | | | 10210.004 | 120225.05 |
| | | Say Epoxy coated steel reinforcem | ent for l | 12.62 | m | straigh | | Rs | 10319.094 | 130226.96 |
| 9 5.1 | 22.6+OD 16 | placing in position and binding bars of grade Fe-500D or more | g all cor | | - | - | - | - | - | |
| | | Quantity as per item No.3 | 1 | | 20.57 | m ³ | 120.00 | kg/m ³ | 2468.4 | |
| | | Quantity as per item No.4 | 1 | | 12.62 | | 100.00 | kg/m ³ | 1262 | |
| | | Total | | | | | | | 3730.4 | |
| | | Say | | 3730.4 | kg | | a | Rs | 104.90925 | 391353.47 |
| 10 4. | 12 | Extra for providing and mixing weight of cement as per manuf | | | | ement co | oncrete v | vork in | doses by | |
| | | | | Â | | 3 | | 3 | | |
| | | Quantity as per item No.3 | 1 | | 20.57 | | 340.00 | | | |
| | | Quantity as per item No.4 | 1 | | 12.62 | m' | 330.00 | kg/m' | | |
| | | Total | | | | | | | 11158.4 | |
| | | Say | | 223.168 | ÷ | |) | Rs | 70.77 | 15792.48 |
| 11 5. | 9.1 | Centering and shuttering inclu Foundations, footings, bases of | | nns, etc. for m | hass conc | rete | | | | |
| | | Bottom slab(3.14*D*H) | 1 | 17.584 | | 0.3 | | | | |
| | | Total | | | | | 5.28 | | | |
| | | Say | | 5.28 | m ² | | a | Rs | 350.00369 | 1846.34 |
| 12 5.9 | 9.2 | Centering and shuttering inclu thickness) including attached p | | | | | | | :Walls (any | |
| | | | | | | | | | | |
| | | For well walls outside(3.14*D*H) | 1 | 16.328 | | 5.15 | 84.09 | m ² | | |
| | | | 1 | 16.328 14.444 | | 5.15 5.15 | 84.09 74.39 | m ² m ² | | |

| | | Total | | | | | 220.22 | m ² | | |
|----|---------|---|--|---|---|---|--|--|--|----------|
| | | Say | | 220.2158 | m ² | | (a) | Rs | 748.62294 | 164858.6 |
| 13 | 5.9.3 | Centering and shuttering inclu floors, roofs, landings, balcon | | utting, proppi | ing etc. a | and remo | | | :Suspended | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 7.2 | 22.61 | m ² | | |
| | | Beam side | 4 | 4.6 | | 0.3 | 5.52 | | | |
| | | inlet chamber top slab | 1 | 2.8 | | 1.85 | 5.18 | m2 | | |
| | | Total | | | | | 33.31 | m ² | | |
| | | Say | | 33.308 | m ² | | | Rs | 851.51525 | 28362.27 |
| 14 | 2.25 | Filling available excavated ear in layers not exceeding 20cm i watering, lead up to 50 m and Quantity as per item (all kind | n depth | , consolidatin | | | layer by | ramm | | |
| | | of soil) | 1 | | 2 | | 59.58 | | | |
| | | Say | | 59.58 | m | | a | Rs | 269.89771 | 16079.7 |
| 15 | 22.23.1 | Providing and applying integrative treatment to the RCC structure podiums, reservior, sewage & prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 p surfaces and applying the same brush. The material shall meet reducing permeability of concer DIN 1048 and resistant to 16 the shall be capable of self-healing out all complete as per specific performance shall carry guaran coats @ 0.70 kg per sqm | es like rowater tr o of 5 : : arts inte e from r the req rete by r oar hydr g of crac cation a | etaining walls reatment plant 2 (5 parts inte gral crystallin negative (inter uirements as s more than 90% rostatic pressu cks up to a wi nd the direction | of the b , tunnels gral crys- ne slurry mal) side specified % compa ire on ne dth of 0. on of the | asement s / subwa stalline s : 1 part e with th l in ACI ared with gative si 50mm. 7 e enginee | , water ta ay and br lurry : 2 water) fc e help of 212-3R- control de. The control de. The for work r-in-cha For verti | anks, ro ridge do parts vo r horiz Synthe 2010 i concre crystall c shall rge. Th cal sur | oof slabs, eek etc., vater) for contal etic fiber .e by te as per line slurry be carried e product | |
| | | Inside of walls(3.14*d*h) | 1 | 14.444 | | 4.15 | 59.94 | | | |
| | | Total | | | | | 59.94 | m ² | | |
| | 22.23.2 | Say | | 59.9426 | | | 9 | Rs | 595.27518 | 35682.34 |
| - | | Providing and applying integra treatment to the RCC structure podiums, reservior, sewage & prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 p surfaces and applying the same brush. The material shall meet reducing permeability of concr DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guaran coat @1.10 kg per sqm. | es like rowater tr o of 5 : : arts inte e from r the req rete by r oar hydr g of crac cation a | etaining walls reatment plant 2 (5 parts inte gral crystallin negative (inter uirements as more than 90% rostatic pressu cks up to a wi nd the direction | of the b st, tunnels gral crys he slurry mal) sidd specified % compa ure on ne dth of 0. on of the | asement s / subwa stalline s : 1 part e with th l in ACI ared with egative si 50mm. To e enginee | , water ta by and br lurry : 2 water) for e help of 212-3R- control de. The control che work er-in-cha | anks, ro idge de parts v or horiz Synthe 2010 i concre crystall shall i rge. Th | boof slabs, eck etc., vater) for contal etic fiber .e by te as per line slurry be carried e product | |
| | | Bottom slab(3.14*d) | 1 | 14.444 | | | 14.44 | m ² | | |
| | | Total | | | | | 14.44 | | | |
| | | Say | | 14.444 | m ² | | | Rs | 458.7695 | 6626.47 |
| | | GST component | | | | | | | | |
| 17 | 13.7.1 | 12 mm cement plaster finished | l with a | floating coat | of neat c | cement : 1 | :3 (1 cer | ment : | 3 fine sand) | |

| Inside of walls(3.14*d*h) Bottom slab(3.14*d) Top slab (3.14*D) Inlet chamber walls(total length) Total Deduction Manhole Total Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ner coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | of the co 4 w work u ively.) 1 two or m | 4 sing 0.16 litre 16.328 84.0892 ore coats) at a | No. and 0.12 m2 nll locatio | 23 kg 2 litre cc 5.15 ons prep | 10 mm ra 1.00 @ pal tar pe 84.09 @ ared and | m ² m ² m ² m ² m ² m ² Rs ectangu No. Rs rr sqm i | 1629.5057 In the first 61.777845 d as per | 56599.98 6518.02 5194.85 |
|--|--|--|--|--|---|---|--|---|
| Top slab (3.14*D) Inlet chamber walls(total length) Total Deduction Manhole Total Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on nercoat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ver without of the construction of the constru | 3.14 10.75 0.6 135.1521 ut frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | m ² manholes less than No. and 0.12 m2 m1 locatio | 3.65 :455x6 23 kg 2 litre cc 5.15 | 22.61 39.24 136.23 1.08 1.08 135.15 @ 10 mm rd 1.00 @ pal tar pe 84.09 @ ared and | m ² m ² m ² m ² m ² Rs ectangu No. Rs r sqm i | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Inlet chamber walls(total length) Total Deduction Manhole Total Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ne coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ver without of the construction of the constru | 10.75 0.6 135.1521 out frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | m ² manholes less than No. and 0.12 m2 m1 locatio | 3.65 :455x6 23 kg 2 litre cc 5.15 | 39.24 136.23 1.08 1.08 135.15 @ 10 mm re 1.00 @ bal tar pe 84.09 @ ared and | m2 m ² m ² m ² Rs ectangu No. Rs rr sqm i | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Total Deduction Manhole Total Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ner coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ver without of the construction of the constru | 0.6 135.1521 out frame for r ver to be not 4 sing 0.16 litree 16.328 84.0892 ore coats) at a g appropriate | m ² manholes less than No. and 0.12 m2 m1 locatio | :455x6 23 kg 2 litre cc 5.15 | 136.23 1.08 1.08 135.15 @ 10 mm rd 1.00 @ 0al tar pe 84.09 @ ared and | m ² m ² m ² Rs ectangu No. Rs r sqm i Rs applie | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Deduction Manhole Total Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ne coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ver without of the construction of the constru | 135.1521 ut frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | m ² manholes less than No. and 0.12 m2 m1 locatio | 23 kg 2 litre cc 5.15 ons prep | 1.08 1.08 135.15 (0) 10 mm re 1.00 (0) 201 tar pe 84.09 (0) ared and | m ² m ² Rs ectangu No. Rs rr sqm i Rs applie | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Manhole Total Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ner coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ver without of the construction of the constru | 135.1521 ut frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | m ² manholes less than No. and 0.12 m2 m1 locatio | 23 kg 2 litre cc 5.15 ons prep | 1.08 135.15 @ 10 mm rd 1.00 @ bal tar pe 84.09 @ ared and | m ² m ² Rs ectangu No. Rs er sqm i | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Total Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on nercoat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ver without of the construction of the constru | 135.1521 ut frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | m ² manholes less than No. and 0.12 m2 m1 locatio | 23 kg 2 litre cc 5.15 ons prep | 1.08 135.15 @ 10 mm rd 1.00 @ bal tar pe 84.09 @ ared and | m ² m ² Rs ectangu No. Rs er sqm i | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Total after deduction Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ne coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | of the co 4 w work u ively.) 1 two or m | ut frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | manholes less than No. and 0.12 m2 m1 locatio | 23 kg 2 litre cc 5.15 ons prep | 1.08 135.15 @ 10 mm rd 1.00 @ bal tar pe 84.09 @ ared and | m ² m ² Rs ectangu No. Rs er sqm i | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Say Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ne coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | of the co 4 w work u ively.) 1 two or m | ut frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | manholes less than No. and 0.12 m2 m1 locatio | 23 kg 2 litre cc 5.15 ons prep | 135.15 @ 10 mm rd 1.00 @ bal tar pe 84.09 @ ared and | m ² Rs ectangu No. Rs rr sqm i Rs applie | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ne coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | of the co 4 w work u ively.) 1 two or m | ut frame for r ver to be not 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | manholes less than No. and 0.12 m2 m1 locatio | 23 kg 2 litre cc 5.15 ons prep | @ 10 mm ro 1.00 @ oal tar pe 84.09 @ ared and | Rs ectangu No. Rs r sqm i Rs applie | Ilar C.I. 1629.5057 in the first 61.777845 d as per | 6518.02 |
| Supplying and fixing C.I. co cover (light duty) the weight Say Coal tarring two coats on ne coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | of the co 4 w work u ively.) 1 two or m | 4 sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | No. and 0.12 m2 nll locatio | 23 kg 2 litre cc 5.15 ons prep | 10 mm ra 1.00 @ pal tar pe 84.09 @ ared and | No. Rs er sqm i Rs applie | 1629.5057 In the first 61.777845 d as per | |
| Coal tarring two coats on nercoat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ively.) 1 (two or m | sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | e and 0.12 m2 Ill locatio | 5.15 | (a) pal tar pe 84.09 (a) ared and | Rs rr sqm i Rs applie | 61.777845 d as per | |
| Coal tarring two coats on nercoat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ively.) 1 (two or m | sing 0.16 litre 16.328 84.0892 ore coats) at a g appropriate | e and 0.12 m2 Ill locatio | 5.15 | 84.09 @ ared and | r sqm i Rs applie | 61.777845 d as per | |
| coat and second coat respect For walls outside(3.14*D*H Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | ively.) 1 (two or m | 16.328 84.0892 ore coats) at a g appropriate | m2 111 locatio | 5.15 | 84.09 @ ared and | Rs | 61.777845 d as per | 5194.85 |
| Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | two or m | 84.0892 ore coats) at a g appropriate | m2 all location | ons prep | ared and | Rs applie | d as per | 5194.85 |
| Say Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | two or m | 84.0892 ore coats) at a g appropriate | m2 all location | ons prep | ared and | Rs applie | d as per | 5194.85 |
| Finishing with Epoxy paint (manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | | ore coats) at a g appropriate | all locatio | | ared and | applie | d as per | 5194.85 |
| manufacturer's specifications complete. On concrete work Quantity as per item code 13.7.1 Say | | g appropriate | | | | ~ ~ | <u>^</u> | |
| 13.7.1 Say | 1 | 135.1521 | | | | | | |
| | | | | | 0.00 | | 135.1521 | |
| | 1 | 135.1521 | m2 | | a | Rs | 232.67532 | 31446.50 |
| Providing orange colour safe 10910 on 12 mm dia steeel b mm x 25 mm and over all mi mm space between protruded besides necessary and adequ drawing and suitable to with specifications and having ma fixing including fixing in ma 3 coarse sand: 6 graded store | bar conforminimum lo inimum lo d legs have ate anchoor stand the mufacture nholes w | ming to IS:17 ength 263 mm ving 2 mm treating projection bend test and es permanent ith 30x20x15 | 786, havin and wid ad on top ons on tai d chemica identifica cm ceme | ng minin th as 16 surface l length al resista ation ma ent conc | mum cro 5 mm wi by ribbi on 138 r ance test rk to be rete bloc | ss section ith min ing or commas as per visible sk 1:3:6 | ion as 23 imum 112 chequering per standard even after 5 (1cement: | |
| well | 16 | | | | 16.00 | No | | |
| Inlet chamber | 9 | | | | 9.00 | | | |
| Say | 9 | 75 | No. | | | Rs | 568.87984 | 14222 |
| - | il of appi | | | etc to st |) | | | 14222 |
| | | | | | | | | |
| - | n , 32mn | n dia GI-3.17k | g/m | | | ļ | | |
| Outer total-23m/1m c/c | 22 | | | 0.75 | E 17 | 1.0 | 95 205 | |
| | | | | 0.75 | 5.17 | кд | 85.305 | |
| vertical 50mm dia | 1 | | | | 3 17 | kø | 215 00208 | |
| vertical 50mm dia Horizontal 0.25m c/c-32mm | | 22.608 | | | 2.11 | 0 | | |
| vertical 50mm dia | 3 | 22.608 300.30708 | ka | | | Rs | 194.17916 | 58313.38 |
| | railing, staircase railing and primer. 50mm dia G.I5.17kg/n Outer total-23m/1m c/c vertical 50mm dia | railing, staircase railing and similar w primer. 50mm dia G.I5.17kg/m , 32mm Outer total-23m/1m c/c | railing, staircase railing and similar works, includin primer. 50mm dia G.I5.17kg/m , 32mm dia GI-3.17k Outer total-23m/1m c/c vertical 50mm dia 22 Horizontal 0.25m c/c-32mm | railing, staircase railing and similar works, including applyin primer. 50mm dia G.I5.17kg/m , 32mm dia GI-3.17kg/m Outer total-23m/1m c/c vertical 50mm dia 22 Horizontal 0.25m c/c-32mm | railing, staircase railing and similar works, including applying primi primer. 50mm dia G.I5.17kg/m , 32mm dia GI-3.17kg/m Outer total-23m/1m c/c vertical 50mm dia 22 Horizontal 0.25m c/c-32mm | railing, staircase railing and similar works, including applying priming coat of primer. 50mm dia G.I5.17kg/m, 32mm dia GI-3.17kg/m Outer total-23m/1m c/c vertical 50mm dia 22 Horizontal 0.25m c/c-32mm | railing, staircase railing and similar works, including applying priming coat of appr primer. 50mm dia G.I5.17kg/m , 32mm dia GI-3.17kg/m Outer total-23m/1m c/c 0.75 vertical 50mm dia 22 0.75 5.17 kg Horizontal 0.25m c/c-32mm 0 0 0 0 | 50mm dia G.I5.17kg/m , 32mm dia GI-3.17kg/m Image: Constraint of the state of t |

| | | | | | 1 | 1 | | 1 | | |
|----------|-----------|---|----------|------------------------------|----------------|----------|-----------|----------|--------------|----------------|
| | | vertical pipe | 22 | 0.75 | | 0.05 | 0.83 | m2 | | |
| | | Horizontal pipe | 3 | 22.608 | | 0.032 | 2.17 | m2 | | |
| | | Say | | 3.00 | m2 | | a | Rs | 154.62153 | 463.15 |
| | | Filling water with 5000 litre ta | | | | | | | | |
| | | (average) to the reservoir site | - | | | | | - | | |
| | | m using 5 HP diesel engine pu of water etc. complete. | imp set | , hire for tank | er lorry, | tools an | d other a | pplien | ces and cost | |
| 24 | 100.36.1 | of water etc. complete. | | | r | | | | 1 | |
| | | | 1 | 16.6106 | | 4.15 | 68.93 | m3 | | |
| | | Say | | 68.93 | Kilo litr | e | <i>a</i> | Rs | 218.94691 | 15092.88 |
| | | Total-collection | well 2 | | | | | | | ₹ 1,581,558.70 |
| COI | LECTION W | ELL -3 | | | | | | | | |
| . | | | | | | | | | | |
| Ite m | | | | | | | | | | |
| m No. | Item Code | Description | No | L | В | н | v | Unit | Rate | Amount |
| 1 | | Earthwork open well excavation | | | | | • | | | 7 thount |
| | 100.00 | all kinds of soil and conveying | | | | | | | | |
| | 100.00 | 1.5 m including neat banking. | NEW D | OATA (Prepar | ed based | on PHE | ED SDB | - Item I | No.1089 & | |
| | | 1092 | | | - | | | - | | |
| | | Collection well 3 | 1 | 6.2 | 6.2 | 1.5 | 57.66 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 71.5 | m ³ | | | | | |
| | 100.3.5.1 | Do for item 4All kinds of soil | 30% | 71.5 | | | 21.45 | @Rs | 490.76 | ₹ 10,527.0 |
| | 100.3.6.1 | Do for item 4Ordinay | 30% | 71.5 | | | 21.45 | @Rs | 1,241.08 | ₹ 26,621.0 |
| | OD MR-B1 | | 5% | 71.5 | | | 3.58 | @Rs | 1,537.37 | ₹ 5,496.0 |
| | OD MR-NB1 | | 15% | 71.5 | | | 10.73 | @Rs | 2,063.83 | ₹ 22,135.0 |
| | OD HR-B1 | | 5% | 71.5 | | | 3.58 | @Rs | 2,021.27 | ₹ 7,226.0 |
| | OD HR-NB1 | | 15% | 71.5 | | | 10.73 | @Rs | 2,992.67 | ₹ 32,096.0 |
| 2 | 100 | Earthwork open well excavation all kinds of soil and conveying 1.5m to 3.0 m including near b | g and de | positing the s | | | | | | |
| | | Collection well 2 | 1 | 6.2 | 6.2 | 1.5 | 57.66 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 71.5 | m ³ | | | | | |
| | 100.3.5.2 | Do for item 4All kinds of soil | 30% | 71.5 | | | 21.45 | @Rs | 539.87 | ₹ 11,580.0 |
| | 100.3.6.2 | Do for item 4Ordinay rock | 30% | 71.5 | | | 21.45 | @Rs | 1,365.20 | ₹ 29,284.0 |
| | OD MR-B2 | | 5% | 71.5 | | 1 | 3.58 | @Rs | 1,691.11 | ₹ 6,046.0 |
| | OD MR-NB2 | | 15% | 71.5 | | | 10.73 | @Rs | 2,270.24 | ₹ 24,348.0 |
| | OD HR-B2 | | 5% | 71.5 | | | 3.58 | @Rs | 2,223.42 | ₹ 7,949.0 |
| | OD HR-NB2 | | 15% | 71.5 | | | 10.73 | | 3,291.96 | ₹ 35,306.0 |
| 3 | 100 | Earthwork open well excavation all kinds of soil and conveying 3.0m to 4.5 m including neat b | g and de | ve water) for positing the s | | | ve 3.5m a | and upt | to 6.0 m in | |
| - | | Collection well 2 | 1 | 6.2 | 6.2 | 1.5 | 57.66 | | | |
| | | Say | - | 57.66 | | | 1.100 | | | 0 |
| | 100.2.5.2 | Do for item 4All kinds | 0.051 | | | | | 65 | 500.07 | |
| | 100.3.5.3 | of soil | 30% | 57.66 | | | 17.30 | @Rs | 588.91 | ₹ 10,187.0 |

| 100.3.6.3 | Do for item 4Ordinay | 30% | 57.66 | | | 17.30 | @Rs | 1,489.32 | ₹ 25,762.0 |
|-------------------|---|---|---|--|--|--|--|--|------------|
| | rock | | | | | | | | |
| OD MR-B3 | | 5% | 57.66 | | | 2.88 | | 1,844.89 | ₹ 5,319.0 |
| OD MR-NB3 | | 15% | 57.66 | | | 8.65 | | 2,476.65 | ₹ 21,421.0 |
| OD HR-B3 | | 5% | 57.66 | | | 2.88 | _ | 2,425.58 | ₹ 6,993.0 |
| OD HR-NB3 | | 15% | 57.66 | | | 8.65 | | 3,591.27 | ₹ 31,061.0 |
| 100 | Earthwork open well excavation all kinds of soil and conveying 4.5m to 6.0 m including neat b | , and de | positing the s | | | | | | |
| | Collection well 2 | 1 | 6.2 | 6.2 | 0.75 | 28.83 | | | |
| | Say | | 28.83 | m ³ | | | | | (|
| 100.3.5.4 | Do for item 4All kinds of soil | 30% | 28.83 | | | 8.65 | @Rs | 638.02 | ₹ 5,518.0 |
| 100.3.6.4 | Do for item 4Ordinay rock | 30% | 28.83 | | | 8.65 | @Rs | 1,613.37 | ₹ 13,954.(|
| OD MR-B4 | | 5% | 28.83 | | | 1.44 | @Rs | 1,998.55 | ₹ 2,881.0 |
| OD MR-NB4 | | 15% | 28.83 | | | 4.32 | @Rs | 2,682.94 | ₹ 11,602.0 |
| OD HR-B4 | | 5% | 28.83 | | | 1.44 | @Rs | 2,627.62 | ₹ 3,788.0 |
| OD HR-NB4 | | 15% | 28.83 | | | 4.32 | @Rs | 3,890.39 | ₹ 16,824.0 |
| 5 | Earthwork open well excavation all kinds of soil and conveying 6 m to 7.5m including neat bar Collection well 2 | , and de | | | | | | | |
| | Say | 1 | 0 | m ³ | | | | | |
| | Do for item 4All kinds | | 0 | m | | | | | |
| 100.3.5.5 | of soil | 30% | 0 | | | 0.00 | @Rs | 687.06 | ₹0.0 |
| 100.3.6.5 | Do for item 4Ordinay rock | 30% | 0 | | | 0.00 | @Rs | 1,737.49 | ₹0.0 |
| OD MR-B5 | | 5% | 0 | | | 0.00 | @Rs | 2,152.30 | ₹ 0.0 |
| OD MR-NB5 | | 15% | 0 | | | 0.00 | @Rs | 2,889.35 | ₹0.(|
| OD HR-B5 | | 5% | 0 | | | 0.00 | @Rs | 2,829.76 | ₹0.(|
| OD HR-NB5 | | 15% | 0 | | | 0.00 | | 4,189.70 | ₹ 0.(|
| 6 4.1.6 | Providing and laying in position centering and shuttering - All v III): 6 graded stone aggregate 4 Collection well 2 | work up | to plinth leven nominal size) | el : 1:3:6 | (1 Cem | ent : 3 co | • | | |
| | Inlet chamber | 1 | 6.2 | 6.2 | 0.2 | 7.69 | | | |
| | | 1 | 4.1 | 2.15 | 0.2 | 1.76 | 3 | | |
| | Total | | | 3 | | 9.45 | | | |
| 7 5.37.1 + 5.34.1 | Say | | 9.45 | m | | a | Rs | 7527.0608 | 71130.72 |
| | Providing and laying in position concrete work, using Sulphate manufactured in fully automati for all leads, having continuou grade for reinforced cement con- site of laying, excluding the co- including cost of admixtures in setting of concrete, improve we direction of the Engineer-in-ch | e Resist ic batch s agitat oncrete ost of con n recom orkabil | ant Cement (ing plant and ed mixer, mar work, includin entering, shut imended prop- ity without im | (SRC) co transport nufactured ng pumpi tering fin ortions as pairing s | ntent as red to si d as per ng of R. ishing a s per IS trength | per appr te of wor mix desi .M.C. fro nd reinfo : 9103 to and dura | roved d k in tra ign of s om tran orceme accele bility a | lesign mix, ansit mixer specified sit mixer to nt, erate/ retard s per | |

| | | Culture 11.2 | | | | | | 1 | | |
|----|--------------|--|---|--|--|---|---|--|--|-----------|
| | | Collection well 2 | | | | | | 3 | | |
| | | Bottom slab(3.14/4*(4.6+0.6+ | 1 | 23.75 | | 0.3 | 7.12 | | | |
| | | wall(3.14/4*(5.2^2-4.6^2))*H | 1 | 4.62 | 0.30 | | 6.58 | | | |
| | | Inlet chamber bottom slab | 1 | 3.95 | 1.85 | | 1.46 | | | |
| | | Inlet chamber wall | 2 | 3.70 | 3.55 | 0.2 | 5.25 | | | |
| | | Inlet chamber wall | 2 | 1.25 | 3.55 | 0.2 | 1.78 | | | |
| | | Total | | | | | 22.19 | m³ | | |
| | | Say | | 22.19 | m ³ | | a | Rs | 10404.79 | 230882.3 |
| 8 | 5.37.1 | Providing and laying in position concrete work, using cement of automatic batching plant and th continuous agitated mixer, man cement concrete work, includii excluding the cost of centering admixtures in recommended ph concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a | ontent a ranspor nufactu ng pum g, shutte roportic withou cement o | as per approve ted to site of v red as per mix ping of R.M.C ering finishing ons as per IS : t impairing sta content consid | ed design work in the design of C. from the and rein 9103 to rength an lered in t | mix, m ransit m of speci: ransit m forceme accelera d durab his item | anufactu ixer for a fied grad ixer to si ent, inclu ate/ retard ility as p i is @ 33 | red in f all lead e for re ite of la iding co d settin er direc 0 kg/ | fully s, having inforced ying , ost of g of | |
| 0 | 5.57.1 | | is per u | esign niix is p | ayable/16 | coverat | ne separ | atery). | | |
| | | wall(3.14/4*(5.2^2- 4.6^2))*H | 1 | 4.62 | 0.30 | 1.00 | 1.38 | m ³ | | |
| | | Top slab incl.cantilever | 1 | 4.02 | 0.50 | 1.00 | 1.50 | | | |
| | | beam(3.14/4*(4.6+0.6+2)^2* | | | | | | 2 | | |
| | | 0.2 | 1 | 40.69 | | 0.2 | 8.14 | m' | | |
| | | Main beam | 2 | 4.60 | | 0.3 | 2.76 | m3 | | |
| | | Inlet chamber top slab | 1 | 2.80 | 1.85 | 0.2 | 0.56 | | | |
| | | Total | | | | | 12.84 | m³ | | |
| | | Deduction | | | | | | | | |
| | | Manhole | 4 | 0.6 | 0.45 | 0.2 | 0.22 | | | |
| | | Total | | | | | 0.22 | | | |
| | | Total after deduction | | | | | 12.62 | m ³ | | |
| | | Say | | 12.62 | m ³ | | a | Rs | 10319.094 | 130226.96 |
| 9 | 5.22.6+OD 16 | Epoxy coated steel reinforcem placing in position and binding bars of grade Fe-500D or more | g all con | | linth leve | l. Therr | no-Mech | nanicall | | |
| | | Quantity as per item No.3 | 1 | | 22.19 | | 120.00 | | 2662.8 | |
| | | Quantity as per item No.4 | 1 | | 12.62 | m³ | 100.00 | kg/m ³ | 1262 | |
| | | Total | | | | | | | 3924.8 | |
| | | Say | | 3924.8 | kg | | a | Rs | 104.90925 | 411747.82 |
| 10 | 4.12 | Extra for providing and mixing weight of cement as per manual | | | n. | | oncrete v | vork in | doses by | |
| | | Quantity as per item No.3 | 1 | | 22.19 | | 340.00 | kg/m ³ | 7544.6 | |
| | | Quantity as per item No.4 | 1 | | 12.62 | m ³ | 330.00 | kg/m ³ | 4164.6 | |
| | | Total | | | | | | | 11709.2 | |
| | | Say | | 234.184 | | | | Rs | 70.77 | 16572.03 |
| 11 | 5.9.1 | Centering and shuttering inclu Foundations, footings, bases of | | nns, etc. for m | | rete | | | | |
| | | Bottom slab(3.14*D*H) | 1 | 17.584 | | 0.3 | 5.28 | | | |
| | | Total | | 5.28 | | | 5.28 | | | |
| | | Say | | | | | | Rs | 350.00369 | |

| | | Centering and shuttering inclu | | | | | | | :Walls (any | |
|----|---------|--|--|--|---|--|---|--|--|----------|
| 12 | 5.9.2 | thickness) including attached p | oilasters | , butteresses, | plinth and | 1 string | courses | etc. | | |
| | | For well walls outside(3.14*D*H) | 1 | 16.328 | | 5.75 | 93.89 | m^2 | | |
| | | Forwell walls inside(3.14*d*) | 1 | 14.444 | | 4.75 | 68.61 | m^2 | | |
| | | | 4 | | | | 69.58 | | | |
| | | Inlet chamber wall | 4 | 4.9 | | 3.55 | | | | |
| | | Total | | | 2 | | 232.08 | | | |
| | | Say Centering and shuttering inclu | dina sti | 232.075 | m ng etc. an | d remo | | Rs rm for | 748.62294 | 173736.6 |
| 13 | 5.9.3 | floors, roofs, landings, balconi | | | | | oval 01 10 | 1111 101 | .Suspended | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 7.2 | 22.61 | m ² | | |
| | | Beam side | 4 | 4.6 | | 0.3 | 5.52 | | | |
| | | inlet chamber top slab | 1 | 2.8 | | 1.85 | 5.18 | | | |
| | | Total | - | 2.0 | | 1.00 | 33.31 | | | |
| | | Say | | 33.308 | m^2 | | | Rs | 851.51525 | 28362.2 |
| | | Filling available excavated ear | th (exc) | | | nlinth | <u> </u> | | | 20302.2 |
| | | in layers not exceeding 20cm i | | | | | | | | |
| 14 | 2.25 | watering, lead up to 50 m and | lift upto | o 1.5 m. | | - | | | - | |
| | | Quantity as per item (all kind | | | | | | 3 | | |
| | | of soil) | 1 | | 2 | | 68.85 | | | |
| | | Say | | 68.85 | m | | a | Rs | 269.89771 | 18581.6 |
| | | podiums, reservior, sewage & prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pr surfaces and applying the same brush. The material shall meet | o of 5 : arts inte e from 1 the req | reatment plant 2 (5 parts integral crystallin negative (inter uirements as | t, tunnels / gral crystane slurry : mal) side v specified i | / subwa alline s 1 part with the in ACI | ay and br lurry : 2 water) fo e help of 212-3R- | idge de parts v or horiz Synthe 2010 i | vater) for contal etic fiber .e by | |
| | | prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pa surfaces and applying the same brush. The material shall meet reducing permeability of conce DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific | o of 5 : : arts inte e from r the req rete by r oar hydr g of craa cation a | reatment plant 2 (5 parts inte ggral crystallin negative (inter uirements as more than 909 rostatic pressu cks up to a wi nd the direction | t, tunnels / gral crystane slurry : rnal) side v specified i % compare the on negative on negative on negative on negative on negative on negative on of the e | / subwa alline s 1 part with the n ACI ed with ative si 0mm. T enginee | and br lurry : 2 water) for e help of 212-3R- control de. The cr he work er-in-char | idge de parts v or horiz Synthe 2010 i concre crystall shall f rge. Th | eck etc., vater) for contal etic fiber .e by te as per line slurry be carried e product | |
| 15 | 22 23 1 | prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pr surfaces and applying the same brush. The material shall meet reducing permeability of concr DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guaran | o of 5 : : arts inte e from r the req rete by r oar hydr g of craa cation a | reatment plant 2 (5 parts inte ggral crystallin negative (inter uirements as more than 909 rostatic pressu cks up to a wi nd the direction | t, tunnels / gral crystane slurry : rnal) side v specified i % compare the on negative on negative on negative on negative on negative on negative on of the e | / subwa alline s 1 part with the n ACI ed with ative si 0mm. T enginee | and br lurry : 2 water) for e help of 212-3R- control de. The cr he work er-in-char | idge de parts v or horiz Synthe 2010 i concre crystall shall f rge. Th | eck etc., vater) for contal etic fiber .e by te as per line slurry be carried e product | |
| 15 | 22.23.1 | prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pa surfaces and applying the same brush. The material shall meet reducing permeability of conce DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guarar coats @ 0.70 kg per sqm | o of 5 : : arts inte e from r the req rete by r oar hydr g of craa cation a | reatment plant 2 (5 parts inte egral crystallin negative (inter uirements as more than 909 rostatic pressu cks up to a wi nd the direction 10 years agai | t, tunnels / gral crystane slurry : rnal) side v specified i % compare the on negative on negative on negative on negative on negative on negative on of the e | / subwa alline s 1 part with the in ACI ed with ative si 0mm. T enginee akage. 1 | ay and br lurry : 2 water) for e help of 212-3R- control de. The of the work gr-in-chai For verti | idge de parts vor synthe 2010 i concre crystall shall rge. Th cal sur | eck etc., vater) for contal etic fiber .e by te as per line slurry be carried e product | |
| 15 | 22.23.1 | prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pa surfaces and applying the same brush. The material shall meet reducing permeability of conce DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guarar coats @ 0.70 kg per sqm Inside of walls(3.14*d*h) | o of 5 : : arts inte e from r the req rete by r oar hydr g of craa cation a | reatment plant 2 (5 parts inte ggral crystallin negative (inter uirements as more than 909 rostatic pressu cks up to a wi nd the direction | t, tunnels / gral crystane slurry : rnal) side v specified i % compare the on negative on negative on negative on negative on negative on negative on of the e | / subwa alline s 1 part with the n ACI ed with ative si 0mm. T enginee | ay and br lurry : 2 water) for e help of 212-3R- control de. The of the work gr-in-chai For verti | idge de parts v or horiz Synthe 2010 i concre crystall shall rge. Th cal sur m ² | eck etc., vater) for contal etic fiber .e by te as per line slurry be carried e product | |
| 15 | 22.23.1 | prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pa surfaces and applying the same brush. The material shall meet reducing permeability of concer DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guarar coats @ 0.70 kg per sqm Inside of walls(3.14*d*h) Total | o of 5 : : arts inte e from r the req rete by r oar hydr g of craa cation a | reatment plant 2 (5 parts inte egral crystallin hegative (inter uirements as a more than 90% rostatic pressu cks up to a wi nd the direction 10 years agai | t, tunnels / gral crysta ne slurry : rnal) side v specified i % compare ire on nega dth of 0.50 on of the e nst any lea | / subwa alline s 1 part with the in ACI ed with ative si 0mm. T enginee akage. 1 | ay and br lurry : 2 water) fc e help of 212-3R- control de. The o The work gr-in-char For verti 68.61 68.61 | idge dø parts vor r horiz Synthe 2010 i concre crystall s shall f rge. Th cal sur m ² m ² | eck etc., vater) for contal etic fiber .e by te as per line slurry be carried e product face two | 40841.2 |
| | 22.23.1 | prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pa surfaces and applying the same brush. The material shall meet reducing permeability of conce DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guarar coats @ 0.70 kg per sqm Inside of walls(3.14*d*h) | 0 of 5 :: arts inte e from 1 the req rete by 1 oar hydr g of crace cation a htee for 1 al crysta s like ro water the o of 5 :: arts inte e from 1 the req rete by 1 output to 1 ou | reatment plant 2 (5 parts inter egral crystallin negative (inter uirements as a more than 90% rostatic pressu- cks up to a wi nd the direction 10 years again 14.444 68.609 Alline slurry o etaining walls reatment plant 2 (5 parts inter gral crystallin negative (inter uirements as a more than 90% rostatic pressu- cks up to a wi nd the direction | t, tunnels / gral crysta he slurry : specified i compare tre on nega dth of 0.50 on of the e nst any lea m^2 f hydrophi of the bass t, tunnels / gral crysta he slurry : mal) side w specified i compare t, compare t, tunnels / gral crysta he slurry : mal) side w specified i compare t, compare t, to a surry : mal) side w the slurry i the slurry i t | / subwa alline s 1 part with the in ACI ed with ative si 0mm. T enginee akage. 1 4.75 ilic in r sement, / subwa alline s 1 part with the in ACI ed with ative si 0mm. T enginee | y and br lurry : 2 water) fc e help of 212-3R- control de. The of the work r-in-chainer 68.61 <u>(@)</u> hature for y and br lurry : 2 water) fc e help of 212-3R- control de. The of the work r-in-chainer (control) for e help of 212-3R- control de. The of the work | idge de parts v or horiz Synthe 2010 i concre crystall shall rge. Th cal sur m ² Rs r water anks, ro idge de parts v or horiz Synthe 2010 i concre crystall a shall concre idge de parts v concre crystall synthe 2010 i concre crystall concre crystall shall concre crystall concre crystall rge. Th cal sur | eck etc., vater) for contal etic fiber e by te as per line slurry be carried e product face two 595.27518 proofing bof slabs, eck etc., vater) for contal etic fiber e by te as per line slurry be carried e product | 40841.2 |

| | | Total | | | | | 14.44 | m ² | | |
|----|---------|---|----------|-----------------|----------------|------------|------------|----------------|--------------|---------|
| | | Say | | 14.444 | m ² | | | Rs | 458.7695 | 6626.4 |
| | | | · | | | | G | 10 | 10011070 | |
| 17 | 13.7.1 | 12 mm cement plaster finished | l with a | floating coat | of neat c | ement : | 1:3 (1 ce | ment : 1 | 3 fine sand) | |
| | | Inside of walls(3.14*d*h) | 1 | 14.444 | | 4.75 | 68.61 | | | |
| | | Bottom slab(3.14*d) | 1 | 14.444 | | | 14.44 | | | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 7.2 | 22.61 | m ² | | |
| | | Inlet chamber walls(total leng | 1 | 10.75 | | 3.55 | 38.16 | m2 | | |
| | | Total | | | | | 143.82 | m ² | | |
| | | Deduction | | | | | | | | |
| | | Manhole | 4 | 0.6 | 0.45 | | 1.08 | m ² | | |
| | | Total | | | | | 1.08 | | 1 1 | |
| | | Total after deduction | | | | | 142.74 | | | |
| | | Say | | 142.7435 | m^2 | | | Rs | 418.78727 | 59779.1 |
| 18 | 19.18.1 | Supplying and fixing C.I. co | over wit | | | es :455 | 0 | | | 0,11,11 |
| | | cover (light dut | | | | | | | C | |
| | | | 4 | | | | 1.00 | No. | | |
| | | Say | | 4 | No. | | <i>(a)</i> | Rs | 1629.5057 | 6518.0 |
| | | Coal tarring two coats on new | | sing 0.16 litre | and 0.12 | 2 litre co | oal tar pe | r sqm i | in the first | |
| 19 | 13.59 | coat and second coat respectiv | ely. | | | | | | | |
| | | For walls outside(3.14*D*H) | 1 | 16.328 | | 5.75 | 93.89 | | | |
| | | Say | | 93.886 | m2 | | (a) | Rs | 61.777845 | 5800.0 |
| | | Finishing with Epoxy paint (tw | | | | | | ~ ~ | <u>^</u> | |
| | | manufacturer's specifications i complete. | ncludin | g appropriate | priming | coat, pr | eparation | n of sui | rtace, etc. | |
| 20 | 13.52.2 | On concrete work | | | | | | | | |
| 20 | 10.02.2 | Quantity as per item code | | | | | | | | |
| | | 13.7.1 | 1 | 142.7435 | | | 0.00 | | 142.7435 | |
| | | Say | | 142.7435 | | |) | Rs | 232.67532 | 33212.8 |
| | | Providing orange colour safety | | | | | | • | • | |
| | | 10910 on 12 mm dia steeel bar mm x 25 mm and over all min | | - | | - | | | | |
| | | mm space between protruded l | | | | | | | | |
| | | besides necessary and adequat | | | | | | | | |
| 21 | 19.16 | drawing and suitable to with st | | | | | | | _ | |
| | | specifications and having man | | · · | | | | | | |
| | | fixing including fixing in man 3 coarse sand: 6 graded stone a | | | | | | | | |
| | | 5 coarse sand. O graded stone a | iggiega | ae 20 mm noi | iiiiai size |) Comp | fiele as p | er uesi | gii | |
| | | well | 17 | | | | 17.00 | No | | |
| | | Inlet chamber | 10 | | | | 10.00 | | | |
| | | Say | 10 | 27 | No. | | | Rs | 568.87984 | 15359.7 |
| | | Providing and fixing hand rail | of appr | | | etc. to s |)) | | | 15557.1 |
| 22 | 10.26.3 | railing, staircase railing and sin | ~ ~ | - | - | | | | | |
| | | primer. | | | | | | | | |
| | | 50mm dia G.I5.17kg/m , 321 | mm dia | GI-3.17kg/m | | | | | | |
| | | Outer total-23m/1m c/c | | | | | | | | |
| | | vertical 50mm dia | 22 | | | 0.75 | 5.17 | kg | 85.305 | |
| | | Horizontal 0.25m c/c-32mm | ~ | 00 (00 | | | 2.1- | 1 | 215 00200 | |
| | | dia | 3 | 22.608 | | | 3.17 | kg | 215.00208 | |

| | | Say | | 300.30708 | ka | | a | Rs | 194.17916 | 58313.38 |
|----------|------------|---|----------|-----------------|----------------|-----------|----------------------|---------|---------------|--------------------|
| | | Finishing with Deluxe Multi s | urface 1 | | v | rs and e |) | | | 56515.56 |
| 23 | 13.48.3 | manufacturers specifications: | | | | | | 0 F | | |
| | | vertical pipe | 22 | 0.75 | | 0.05 | 0.83 | m2 | | |
| | | Horizontal pipe | 3 | 22.608 | | 0.032 | 2.17 | m2 | | |
| | | Say | | 3.00 | m2 | | a | Rs | 154.62153 | 463.15 |
| 24 | 100.36.1 | Filling water with 5000 litre ta (average) to the reservoir site a m using 5 HP diesel engine pu of water etc. complete. | and pur | nping the wat | er into th | e reserv | oir of he | ight no | t less than 3 | |
| | | | 1 | 16.6106 | | 4.75 | 78.90 | m3 | | |
| | | Say | | 789.00 | Kilo litr | e | @ | Rs | 218.94691 | 172749.88 |
| | | Total-co | llection | n well 3 | | | | | | ₹ 1,856,674.80 |
| COI | LECTION WE | CLL -1 | | | | | | | | • |
| Ite m | | | | | | | | | | |
| No. | Item Code | Description | | L | В | Н | V | Unit | | Amount |
| 1 | 100.00 | Earthwork open well excavation all kinds of soil and conveying 1.5 m including neat banking. 1092 | g and de | epositing the s | poil with | in initia | ll lead of ED SDB | 50m ai | nd lift up to | |
| | | Collection well 1 | 1 | 7.8 | 7.8 | 1.5 | 91.26 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 105.1 | m ³ | | | | | |
| | 100.3.7.1 | Do for item 4All kinds of soil | 30% | 105.1 | | | 31.53 | @Rs | 471.51 | ₹ 14,867.0 |
| | 100.3.8.1 | Do for item 4Ordinay rock | 30% | 105.1 | | | 31.53 | @Rs | 1,207.11 | ₹ 38,060.0 |
| | OD MR-B6 | | 5% | 105.1 | | | 5.26 | @Rs | 1,495.29 | ₹ 7 <i>,</i> 858.0 |
| | OD MR-NB6 | | 15% | 105.1 | | | 15.77 | @Rs | 2,007.35 | ₹ 31,646.0 |
| | OD HR-B6 | | 5% | 105.1 | | | 5.26 | @Rs | 1,965.96 | ₹ 10,331.0 |
| | OD HR-NB6 | | 15% | 105.1 | | | 15.77 | @Rs | 2,910.76 | ₹ 45,888.0 |
| 2 | 100 | Earthwork open well excavation all kinds of soil and conveying 1.5m to 3.0 m including near the | g and de | epositing the s | | | | | | |
| | | Collection well 2 | 1 | 7.8 | 7.8 | 1.5 | 91.26 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 105.1 | m ³ | | | | | |
| | 100.3.7.2 | Do for item 4All kinds of soil | 30% | 105.1 | | | 31.53 | @Rs | 518.64 | ₹ 16,353.0 |
| | 100.3.8.2 | Do for item 4Ordinay rock | 30% | 105.1 | | | 31.53 | @Rs | 1,327.83 | ₹ 41,866.0 |
| | OD MR-B7 | | 5% | 105.1 | | | 5.26 | @Rs | 1,644.85 | ₹ 8,644.0 |
| | OD MR-NB7 | | 15% | 105.1 | | | 15.77 | @Rs | 2,208.11 | ₹ 34,811.0 |
| | OD HR-B7 | | 5% | 105.1 | | | 5.26 | @Rs | 2,162.58 | ₹ 11,364.0 |
| | OD HR-NB7 | | 15% | 105.1 | | | 15.77 | @Rs | 3,201.86 | ₹ 50,477.0 |

| 100 | Earthwork open well excavational kinds of soil and conveying 3.0m to 4.5 m including neat b | g and de | positing the s | | | | | | |
|------------|---|----------|--------------------------------|----------------|------------|------------|----------|-----------|---------------------|
| | Collection well 1 | 1 | 7.8 | 7.8 | 1.5 | 91.26 | | | |
| | Inlet chamber | 1 | 4.1 | 2.25 | 0.15 | 1.38 | | | |
| | Say | | 91.26 | m ³ | | | | | 0 |
| 100.3.7.3 | Do for item 4All kinds of soil | 30% | 91.26 | | | 27.38 | @Rs | 565.84 | ₹ 15,492.0 |
| 100.3.8.3 | Do for item 4Ordinay rock | 30% | 91.26 | | | 27.38 | @Rs | 1,448.56 | ₹ 39,659.(|
| OD MR-B8 | | 5% | 91.26 | | | 4.56 | @Rs | 1,794.39 | ₹ 8,188.0 |
| OD MR-NB8 | | 15% | 91.26 | | | 13.69 | @Rs | 2,408.87 | ₹ 32 <i>,</i> 975.(|
| OD HR-B8 | | 5% | 91.26 | | | 4.56 | @Rs | 2,359.21 | ₹ 10,765.0 |
| OD HR-NB8 | | 15% | 91.26 | | | 13.69 | | 3,492.97 | ₹ 47,815.(|
| 4 | Earthwork open well excavation kinds of soil and conveying ar 4.5m to 6.0 m including neat b Collection well 1 | nd depos | siting the spoi | | initial le | | | | |
| | Say | | 91.26 | m ³ | | | | | (|
| 100.3.7.4 | Do for item 4All kinds of soil | 30% | 91.26 | | | 27.38 | @Rs | 612.98 | ₹ 16,782.0 |
| 100.3.8.4 | Do for item 4Ordinay rock | 30% | 91.26 | | | 27.38 | @Rs | 1,569.21 | ₹ 42,962.0 |
| OD MR-B9 | | 5% | 91.26 | | | 4.56 | @Rs | 1,943.84 | ₹ 8,870.(|
| OD MR-NB9 | | 15% | 91.26 | | | 13.69 | @Rs | 2,609.52 | ₹ 35,722.0 |
| OD HR-B9 | | 5% | 91.26 | | | 4.56 | @Rs | 2,555.71 | ₹ 11,662. |
| OD HR-NB9 | | 15% | 91.26 | | | 13.69 | @Rs | 3,783.92 | ₹ 51,798.0 |
| 100 | Earthwork open well excavation kinds of soil and conveying ar m to 7.5m including neat bank | nd depos | | | | | | | |
| | Collection well 1 | 1 | 7.8 | 7.8 | 0.15 | 9.13 | | | |
| | Say | | 9.13 | m | | | | | |
| 100.3.7.5 | Do for item 4All kinds of soil | 30% | 9.13 | | | 2.74 | @Rs | 660.10 | ₹ 1,808.0 |
| 100.3.8.5 | Do for item 4Ordinay rock | 30% | 9.13 | | | 2.74 | | 1,689.94 | ₹ 4,629.0 |
| OD MR-B10 | | 5% | 9.13 | | | 0.46 | | 2,093.40 | ₹ 956. |
| OD MR-NB10 | | 15% | 9.13 | | | 1.37 | @Rs | 2,810.28 | ₹ 3,849.0 |
| OD HR-B10 | | 5% | 9.13 | | | 0.46 | | 2,752.32 | ₹ 1,256.0 |
| OD HR-NB10 | | 15% | 9.13 | | | 1.37 | @Rs | 4,075.02 | ₹ 5,581.0 |
| 6 4.1.6 | Providing and laying in positic centering and shuttering - All III): 6 graded stone aggregate | work up | to plinth lev nominal size) | el : 1:3:6 | (1 Cem | ent : 3 co | barse sa | | |
| | Collection well 2 | 1 | 7.8 | 7.8 | 0.2 | 12.17 | | | |
| | Inlet chamber | 1 | 4.1 | 2.15 | 0.2 | 1.76 | | | |
| | Total | | | 2 | | 13.93 | | | |
| | Say | | 13.93 | m | | a | Rs | 7527.0608 | 104851.90 |

| | 5.37.1 + 5.34.1 | | | | | | | | | | |
|---|-----------------|--|--|--|---|---|---|---|---|----------------|-----------|
| | | D 11 | 1 | | 1 | | c | | | | |
| 1 | | Providing and laying in position concrete work, using Sulphate | | | e | | | | | | |
| | | manufactured in fully automati | | | | | | | | | |
| | | for all leads, having continuou | | | | | | | | | |
| | | grade for reinforced cement co | - | | | - | | - | - | | |
| | | site of laying, excluding the co | | | | | | | | | |
| | | including cost of admixtures in | | | | | | | | | |
| | | setting of concrete, improve w | | | | | | | | | |
| | | direction of the Engineer-in-ch | | | | | | | n is @ 330 | | |
| | | kg/ ³ .Excess/less cement used a | is per de | esign mix is p | ayable/re | coverat | ole separa | ately). | | | |
| | | Collection well 1 | | | | | | | | | |
| | | slab(3.14/4*(6.2+0.6+.3)^2* | | | | | | 3 | | | |
| | | 0.3 | 1 | 50.24 | | 0.3 | 15.07 | m' | | | |
| | | wall(3.14/4*(6.8^2- | | (10 | 0.20 | | 10.20 | | | | |
| | | 6.2^2))*H | 1 | 6.12 | 0.30 | | 10.38 | | | | |
| | | Inlet chamber bottom slab | 1 | 3.95 | 1.85 | | 1.46 | | | | |
| | | Inlet chamber wall | 2 | 3.70 | 3.65 | 0.2 | 5.40 | | | | |
| | | Inlet chamber wall | 2 | 1.25 | 3.65 | 0.2 | 1.83 | | | | |
| | | Total | | | | | 34.14 | m ³ | | | |
| | | Say | | 34.14 | m ³ | | (a) | Rs | 10404.79 | | 355219.54 |
| | | Providing and laying in position | | | | | | | • | | |
| | | continuous agitated mixer, man cement concrete work, includin excluding the cost of centering | ng pum | ping of R.M.O | C. from t | ransit m | ixer to si | ite of la | | | |
| 8 | 5.37.1 | admixtures in recommended pr concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a | roportio withou | ons as per IS : t impairing str content consid | 9103 to rength an lered in t | accelera d durab his item | ate/ retard pility as p n is @ 33 | d settin er dire 0 kg/ | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- | roportio withou | ons as per IS : t impairing str content consid | 9103 to rength an lered in t | accelera d durab his item | ate/ retard pility as p n is @ 33 ple separa | d settin er dire 0 kg/ ately). | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H | roportio withou | ons as per IS : t impairing str content consid | 9103 to rength an lered in t | accelera d durab his item ecoveral | ate/ retard pility as p n is @ 33 | d settin er dire 0 kg/ ately). | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever | roportio withou | ons as per IS : t impairing str content consic esign mix is p | 9103 to rength an lered in t ayable/re | accelera d durab his item ecoveral | ate/ retard pility as p n is @ 33 ple separa | d settin er dire 0 kg/ ately). | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* | roportic withou cement of as per d 1 | ons as per IS : t impairing str content consid esign mix is p 6.12 | 9103 to rength an lered in t ayable/re | accelera d durab his item ecoveral 1.00 | ate/ retard vility as p n is @ 33 ple separa 1.84 | d settin ber dire 0 kg/ ately). m ³ | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 | roportio withou ement o as per d 1 | ons as per IS : t impairing str content consid esign mix is p 6.12 60.79 | 9103 to rength an lered in t ayable/re | accelera d durab his item ecoveral 1.00 0.2 | ate/ retard pility as p n is @ 33 ple separt 1.84 12.16 | d settin er dire 0 kg/ ately). m ³ m ³ | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam | roportic withou cement of as per d 1 | ons as per IS : t impairing stu content consid esign mix is p 6.12 60.79 6.20 | 9103 to rength an dered in t ayable/re 0.30 | accelera d durab his item ecoveral 1.00 0.2 0.3 | ate/ retard pility as p n is @ 33 ple separt 1.84 12.16 3.72 | d settin er dire 0 kg/ ately). m ³ m ³ m3 | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab | roportio withou ement o as per d 1 | ons as per IS : t impairing str content consid esign mix is p 6.12 60.79 | 9103 to rength an lered in t ayable/re | accelera d durab his item ecoveral 1.00 0.2 0.3 | ate/ retard ility as p is @ 33 ble separa 1.84 12.16 3.72 0.56 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m3 | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam | roportio withou ement o as per d 1 | ons as per IS : t impairing stu content consid esign mix is p 6.12 60.79 6.20 | 9103 to rength an dered in t ayable/re 0.30 | accelera d durab his item ecoveral 1.00 0.2 0.3 | ate/ retard pility as p n is @ 33 ple separt 1.84 12.16 3.72 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m3 | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab | roportio withou ement o as per d 1 | ons as per IS : t impairing stu content consid esign mix is p 6.12 60.79 6.20 | 9103 to rength an dered in t ayable/re 0.30 | accelera d durab his item ecoveral 1.00 0.2 0.3 | ate/ retard ility as p i is @ 33 ole separ 1.84 12.16 3.72 0.56 18.28 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total | roportio withou ement o as per d 1 | ons as per IS : t impairing stu content consid esign mix is p 6.12 60.79 6.20 | 9103 to rength an dered in t ayable/re 0.30 | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 | ate/ retard ility as p is @ 33 ole separa 1.84 12.16 3.72 0.56 18.28 0.22 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction | roportion withou ement of as per d 1 1 2 1 | ons as per IS : t impairing str content consid esign mix is p 6.12 60.79 6.20 2.80 | 9103 to rength an dered in t ayable/ro 0.30 | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 | ate/ retard ility as p i is @ 33 ole separ 1.84 12.16 3.72 0.56 18.28 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole | roportion withou ement of as per d 1 1 2 1 | ons as per IS : t impairing str content consid esign mix is p 6.12 60.79 6.20 2.80 | 9103 to rength an dered in t ayable/ro 0.30 | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 | ate/ retard ility as p is @ 33 ole separ 1.84 12.16 3.72 0.56 18.28 0.22 0.22 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of | | |
| 8 | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole Total Total after deduction | roportion withou ement of as per d 1 1 2 1 | ons as per IS : t impairing stu content consid esign mix is p 6.12 60.79 6.20 2.80 0.6 | 9103 to rength an dered in t oayable/re 0.30 | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 | ate/ retard ility as p is @ 33 ole separa 1.84 12.16 3.72 0.56 18.28 0.22 0.22 18.06 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of ction of the | | 186362.83 |
| | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole Total Total after deduction Say | roportic withou bement of as per d 1 1 2 1 1 4 | ons as per IS : t impairing stu- content consider esign mix is p 6.12 60.79 6.20 2.80 0.6 18.06 | 9103 to rength an dered in t ayable/re 0.30 1.85 0.45 m ³ | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 0.2 | ate/ retard ility as p is @ 33 ole separ 1.84 12.16 3.72 0.56 18.28 0.22 0.22 18.06 @ | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of ction of the | | 186362.83 |
| | 5.37.1 | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole Total Total after deduction | roportic withou ement of as per d 1 1 2 1 2 1 4 4 ent for g all con | ons as per IS : t impairing sti content consid esign mix is p 6.12 60.79 6.20 2.80 0.6 18.06 R.C.C. work i | 9103 to rength an dered in t ayable/re 0.30 1.85 0.45 m ³ | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 0.2 0.2 0.2 | ate/ retard illity as p is @ 33 ole separa 1.84 12.16 3.72 0.56 18.28 0.22 0.22 18.06 @ tening, c | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of ction of the | | 186362.83 |
| | | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole Total Total after deduction Say Epoxy coated steel reinforcem placing in position and binding | roportic withou ement of as per d 1 1 2 1 2 1 4 4 ent for g all con | ons as per IS : t impairing sti content consid esign mix is p 6.12 60.79 6.20 2.80 0.6 18.06 R.C.C. work i | 9103 to rength an dered in t ayable/re 0.30 1.85 0.45 m ³ | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 0.2 0.2 0.2 | ate/ retard illity as p is @ 33 ole separa 1.84 12.16 3.72 0.56 18.28 0.22 0.22 18.06 @ tening, c | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of ction of the 10319.094 bending, ly Treated | | 186362.83 |
| | | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole Total Total after deduction Say Epoxy coated steel reinforcem placing in position and binding bars of grade Fe-500D or more Quantity as per item No.3 | roportic withou ement of as per d 1 1 2 1 2 1 4 4 ent for g all con | ons as per IS : t impairing sti content consid esign mix is p 6.12 60.79 6.20 2.80 0.6 18.06 R.C.C. work i | 9103 to rength an dered in t ayable/re 0.30 1.85 0.45 0.45 m ³ including linth leve | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.2 | ate/ retard ility as p is @ 33 ole separa 1.84 12.16 3.72 0.56 18.28 0.22 18.06 @ tening, c mo-Mech | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of ction of the 10319.094 bending, ly Treated 4096.8 | kg | 186362.83 |
| | | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole Total Total after deduction Say Epoxy coated steel reinforcem placing in position and binding bars of grade Fe-500D or more Quantity as per item No.3 Quantity as per item No.4 | roportic withou ement of as per d 1 1 2 1 2 1 4 4 ent for g all con | ons as per IS : t impairing sti content consid esign mix is p 6.12 60.79 6.20 2.80 0.6 18.06 R.C.C. work i | 9103 to rength an dered in t ayable/re 0.30 1.85 0.45 m ³ including | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.2 | ate/ retard ility as p is @ 33 ole separa 1.84 12.16 3.72 0.56 18.28 0.22 18.06 @ tening, c no-Mech 120.00 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of ction of the 10319.094 bending, ly Treated 4096.8 1806 | kg kg | 186362.83 |
| | | concrete, improve workability Engineer-in-charge. (Note :- C cum.Excess/less cement used a WELL wall(3.14/4*(6.8^2- 6.2^2))*H Top slab incl.cantilever beam(3.14/4*(6.2+0.6+2)^2* 0.2 Main beam Inlet chamber top slab Total Deduction Manhole Total Total after deduction Say Epoxy coated steel reinforcem placing in position and binding bars of grade Fe-500D or more Quantity as per item No.3 | roportic withou ement of as per d 1 1 2 1 2 1 4 4 ent for g all con | ons as per IS : t impairing sti content consid esign mix is p 6.12 60.79 6.20 2.80 0.6 18.06 R.C.C. work i | 9103 to rength an dered in t oayable/re 0.30 1.85 0.45 m ³ including linth leve 34.14 18.06 | accelera d durab his item ecoveral 1.00 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.2 | ate/ retard ility as p is @ 33 ole separ 1.84 12.16 3.72 0.56 18.28 0.22 0.22 18.06 @ tening, c no-Mech 120.00 | d settin er dire 0 kg/ ately). m ³ m ³ m ³ m ³ m ³ m ³ m ³ m ³ | g of ction of the 10319.094 bending, ly Treated 4096.8 | kg kg kg | 186362.8 |

| | | Extra for providing and mixing | y water | proofing mate | erial in ce | ement c | oncrete v | vork in | doses by | | |
|-----|---------|---|-----------------------------------|---|---------------------------------------|--|------------------------|---------------------------------------|-------------|----|-----------|
| 10 | 4.12 | weight of cement as per manuf | | | | | | , or it in | uoses og | | |
| | | Quantity as per item No.3 | 1 | | 34.14 | m ³ | 340.00 | kg/m ³ | 11607.6 | kg | |
| | | Quantity as per item No.4 | 1 | | 18.06 | m ³ | 330.00 | kg/m ³ | 5959.8 | kg | |
| | | Total | | | | | | | 17567.4 | kg | |
| | | Say | | 351.348 | bags | | a) | Rs | 70.77 | | 24863.14 |
| | | Centering and shuttering inclu | ding str | | | nd remo | | | | | |
| 11 | 5.9.1 | :Foundations, footings, bases of | of colun | nns, etc. for n | hass conc | rete | | | | | |
| | | well Bottom slab(3.14*D*H) | 1 | 21.352 | | 0.3 | 6.41 | | | | |
| | | Total | | | | | 6.41 | m ² | | | |
| | | Say | | 6.41 | m ² | | a | Rs | 350.00369 | | 2241.98 |
| | | | | | | | | | | | |
| 10 | 502 | Centering and shuttering inclu- | | | | | | | :Walls (any | | |
| 12 | 5.9.2 | thickness) including attached p For well walls | masters | s, butteresses, | piinth an | | g courses | etc. | | | |
| | | outside(3.14*D*H) | 1 | 21.352 | | 6.65 | 141.99 | m ² | | | |
| | | Forwell walls inside(3.14*d*) | 1 | 19.468 | | 5.65 | | | | | |
| | | Inlet chamber wall | 4 | 4.9 | | 3.65 | | | | | |
| | | Total | | 1.5 | | 5.05 | 323.53 | | | | |
| | | Say | | 323.525 | m^2 | | (a) | | 748.62294 | | 242198.24 |
| | | Centering and shuttering inclu | ding str | | | nd remo | 0 | | | | 2121/0121 |
| 13 | 5.9.3 | floors, roofs, landings, balconi | | | | | | | .ouspenueu | | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 8.8 | 27.63 | m ² | | | |
| | | Beam side | 4 | 6.2 | | 0.45 | | | | | |
| | | inlet chamber top slab | 1 | 2.8 | | 1.85 | 5.18 | m2 | | | |
| | | Total | | | | | 43.97 | m ² | | | |
| | | Say | | 43.972 | m ² | | | Rs | 851.51525 | | 37442.83 |
| | | Filling available excavated ear | | • | | • • | | | | | |
| 1.4 | 2.25 | in layers not exceeding 20cm i | | | ig each d | eposited | l layer by | ramm | ing and | | |
| 14 | 2.25 | watering, lead up to 50 m and Quantity as per item (all kind | lift upto | 5 1.5 m. | | | | | | | |
| | | of soil) | 1 | | | | 120.56 | m ³ | | | |
| | | Say | | 120.56 | m ³ | | (a) | | 269.89771 | | 32537.52 |
| | | Say | ļ | 120.30 | | | <i>u</i> | 13 | 207.0771 | | 52557.52 |
| | | Providing and applying integra | al crysta | alline slurry o | f hydropł | nilic in i | nature for | r water | proofing | | |
| | | treatment to the RCC structure | - | - | | | | - | | | |
| | | podiums, reservior, sewage & | | | | | | | | | |
| | | prepared by mixing in the ratio | | · • | • • | | | • | · · | | |
| | | vertical surfaces and 3 : 1 (3 pa | | | | | | | | | |
| | | surfaces and applying the same | | e . | · · · | | | | | | |
| | | brush. The material shall meet | | | | | | | | | |
| | | | ete by 1 | | | | | | | | |
| | | reducing permeability of concr | | | | parive si | ide. The o | erystan | ine slurry | | |
| | | DIN 1048 and resistant to 16 b | oar hydr | | | | The work | chall k | a carried | | |
| | | DIN 1048 and resistant to 16 b shall be capable of self-healing | oar hydr g of crac | cks up to a wi | dth of 0. | 50mm. ' | | | | | |
| | | DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific | oar hydr g of crac cation a | cks up to a wi | dth of 0.5 on of the | 50mm. 7 enginee | er-in-cha | rge. Th | e product | | |
| 15 | 22.23.1 | DIN 1048 and resistant to 16 b shall be capable of self-healing | oar hydr g of crac cation a | cks up to a wi | dth of 0.5 on of the | 50mm. 7 enginee | er-in-cha | rge. Th | e product | | |
| 15 | 22.23.1 | DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guarar | oar hydr g of crac cation a | cks up to a wi | dth of 0.3 on of the nst any le | 50mm. 7 enginee | er-in-cha For verti | rge. Th cal surf | e product | | |
| 15 | 22.23.1 | DIN 1048 and resistant to 16 b shall be capable of self-healing out all complete as per specific performance shall carry guarar coats @ 0.70 kg per sqm | oar hydr g of crac cation a | cks up to a wi nd the direction 10 years agai | dth of 0.3 on of the nst any le | 50mm. ⁷ enginee eakage. | er-in-cha | rge. Th cal surf m ² | e product | | |

| 16 | 22.23.2 | Providing and applying integrative treatment to the RCC structure podiums, reservior, sewage & prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 p surfaces and applying the same brush. The material shall meet reducing permeability of concc DIN 1048 and resistant to 16 l shall be capable of self-healing out all complete as per specific performance shall carry guarancoat @1.10 kg per sqm. | es like r water to o of 5 : arts into e from r the req rete by bar hydr g of cra- cation a | etaining walls reatment plant 2 (5 parts integral crystallin negative (inter uirements as more than 909 rostatic pressu cks up to a wi nd the direction | of the ba s, tunnels gral crysme slurry mal) side specified % compar- ure on neg dth of 0.5 on of the | asement / subwa talline s : 1 part with th in ACI red with gative si 50mm. enginee | , water ta ay and bi lurry : 2 water) fo e help of 212-3R- control ide. The Fhe work er-in-cha | anks, ro ridge do parts wo r horiz Synthe 2010 i concre crystall shall l rge. Th | oof slabs, eeck etc., vater) for contal etic fiber e by te as per line slurry be carried e product | |
|----|---------|--|---|---|--|---|---|---|---|----------|
| | | Bottom slab(3.14*d) | 1 | 19.468 | | | 19.47 | | | |
| | | Total | | | | | 19.47 | m ² | | |
| | | Say | | 19.468 | m ² | | | Rs | 458.7695 | 8931.32 |
| 17 | 13.7.1 | 12 mm cement plaster finished | l with a | floating coat | of neat of | ement · | 1.3 (1 ce | ment · | 3 fine sand) | |
| 1/ | 1.J./.1 | Inside of walls(3.14*d*h) | 1 with a | 19.468 | or near C | 6.65 | 129.46 | - | | |
| | | Bottom slab(3.14*d) | 1 | 19.468 | | 0.05 | 129.10 | | | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 8.8 | 27.63 | | | |
| | | Inlet chamber walls(total | 1 | 5.11 | | 0.0 | 27.05 | | | |
| | | length) | 1 | 10.75 | | 3.65 | 39.24 | | | |
| | | Total | | | | | 215.80 | m ² | | |
| | | Deduction | | | | | | | | |
| | | Manhole | 4 | 0.6 | 0.45 | | 1.08 | m ² | | |
| | | Total | | | | | 1.08 | | | |
| | | Total after deduction | | | | | 214.72 | m ² | | |
| | | Say | | 214.7197 | | | | Rs | 418.78727 | 89921.88 |
| 18 | 19.18.1 | Supplying and fixing C.I. co | over wit | hout frame fo | r manhol | les :455 | x610 mn | n rectar | ngular C.I. | |
| | | | 4 | | | | 1.00 | No. | | |
| | | Say | | 4 | No. | | a | Rs | 1629.5057 | 6518.02 |
| 19 | 13.59 | Coal tarring two coats on new coat and second coat respectiv | | sing 0.16 litre | and 0.12 | 2 litre co | oal tar pe | er sqm i | in the first | |
| | | For walls outside(3.14*D*H) | 1 | 21.352 | | 5.75 | 122.77 | | | |
| | | Say | | 122.774 | m2 | | | Rs | 61.777845 | 7584.71 |
| 20 | 13.52.2 | Finishing with Epoxy paint (tw manufacturer's specifications i complete. On concrete work | | ore coats) at a | Il locatio | | ared and | applie | d as per | |
| | | Quantity as per item code 13.7.1 | 1 | 214.7197 | | | 0.00 | | 214.7197 | |
| | | Say | | 214.7197 | m2 | | a | Rs | 232.67532 | 49959.97 |

| 21 | 19.16 | Providing orange colour safety 10910 on 12 mm dia steeel bar mm x 25 mm and over all min mm space between protruded besides necessary and adequat drawing and suitable to with st specifications and having man fixing including fixing in man | r confor imum legs hav e ancho tand the ufactur holes w | rming to IS:17 ength 263 mm ving 2 mm trea oring projection be bend test and es permanent rith 30x20x15 | 786, havin and wide ad on top ons on tail d chemica identifica cm ceme | ng mini th as 16 surface l length al resist tion ma ent conc | mum cro 55 mm w e by ribbi a on 138 r ance test ark to be crete bloc | ss secti ith min ng or c nm as j as per visible k 1:3:6 | ion as 23 imum 112 hequering per standard even after 6 (1cement: | |
|-----|------------|---|--|---|--|--|--|---|---|----------------|
| | | 3 coarse sand: 6 graded stone a | aggrega | ite 20 mm non | nınal sıze |) Comp | olete as p | er desig | gn | |
| | | 11 | 20 | | | | 20.00 | ЪT | | |
| | | well | 20 11 | | | | 20.00 11.00 | | | |
| | | Inlet chamber Say | 11 | 21 | No. | | | NO. Rs | 568.87984 | 17635.27 |
| 22 | 10.26.3 | Providing and fixing hand rail railing, staircase railing and simprimer. | | roved size by | welding e | | teel ladde | er railir | ng, balcony | 1/055.27 |
| | | 50mm dia G.I5.17kg/m , 32n | nm dia | GI-3.17kg/m | | | | | | |
| | | Outer total-23m/1m c/c | 20 | | | 0.75 | 5 17 | 1. | 100.57 | |
| | | vertical 50mm dia Horizontal 0.25m c/c-32mm | 28 | | | 0.75 | 5.17 | кg | 108.57 | |
| | | dia | 3 | 28 | | | 3.17 | kg | 266.28 | |
| | | Say | | 374.85 | kg | | | Rs | 194.17916 | 72788.06 |
| 23 | 13.48.3 | Finishing with Deluxe Multi s manufacturers specifications: | urface j | | - | rs and e | \rightarrow | | rimer as per | |
| | | vertical pipe | 28 | 0.75 | | 0.05 | 1.05 | m2 | | |
| | | Horizontal pipe | 3 | 28 | | 0.032 | 2.69 | | | |
| | | Say | | 3.74 | m2 | | | Rs | 154.62153 | 577.98 |
| 24 | 100.36.1 | Filling water with 5000 litre ta (average) to the reservoir site a m using 5 HP diesel engine pu of water etc. complete. | and pur | nping the wate | er into the | e reserv | oir of he d other a | ight no ppliend | t less than 3 | |
| | | Say | | | Kilo litre | | | Rs | 218.94691 | 373284.8 |
| | | Suy | | 1704.91 | itilo nut | | <u>u</u> | 105 | 210.74071 | 070204.0 |
| | | Total-co | llection | n well 1 | | | | | | ₹ 2,940,159.25 |
| COI | LECTION WI | | incentor | | | | | | | (2,)+0,13):23 |
| m | Item Code | | No | L | В | Н | V | Unit | Rate | Amount |
| 1 | | Earthwork open well excavation | | | | | • | | | iniount |
| | 100.00 | all kinds of soil and conveying 1.5 m including neat banking. 1092 | | | | | | | | |
| | | Collection well 4 | 1 | 7.6 | 7.6 | 1.5 | 86.64 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 100.48 | | | | | | |
| | 100.3.7.1 | Do for item 4All kinds of soil | 30% | 100.48 | | | 30.14 | @Rs | 471.51 | ₹ 14,213.0 |
| | 100.3.8.1 | Do for item 4Ordinay rock | 30% | 100.48 | | | 30.14 | @Rs | 1,207.11 | ₹ 36,387.0 |
| | OD MR-B6 | | 5% | 100.48 | | | 5.02 | @Rs | 1,495.29 | ₹ 7,512.0 |
| | OD MR-NB6 | | 15% | 100.48 | | | 15.07 | @Rs | 2,007.35 | ₹ 30,255.0 |
| | OD HR-B6 | | 5% | 100.48 | | | 5.02 | @Rs | 1,965.96 | ₹ 9,877.0 |
| | OD HR-NB6 | | 15% | 100.48 | | | 15.07 | @Rs | 2,910.76 | ₹ 43,871.0 |

| 2 | | Earthwork open well excavation | on (abo | ve water) for | wells of d | lia. abo | ve 6.0m a | and upt | o 9.0 m in | |
|---|-----------|--|----------|-----------------|----------------|----------|-----------|---------|------------|------------|
| | | all kinds of soil and conveying | g and de | positing the s | | | | | | |
| | 100 | 1.5m to 3.0 m including neat b | anking | | | | | | | |
| | | Collection well 4 | 1 | 7.6 | 7.6 | 1.5 | 86.64 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 100.48 | m ³ | | | | | |
| | 100.3.7.2 | Do for item 4All kinds of soil | 30% | 100.48 | | | 30.14 | @Rs | 518.64 | ₹ 15,634.0 |
| | 100.3.8.2 | Do for item 4Ordinay rock | 30% | 100.48 | | | 30.14 | @Rs | 1,327.83 | ₹ 40,026.0 |
| | OD MR-B7 | | 5% | 100.48 | | | 5.02 | @Rs | 1,644.85 | ₹ 8,264.0 |
| | OD MR-NB7 | | 15% | 100.48 | | | 15.07 | @Rs | 2,208.11 | ₹ 33,281.0 |
| | OD HR-B7 | | 5% | 100.48 | | | 5.02 | @Rs | 2,162.58 | ₹ 10,865.0 |
| | OD HR-NB7 | | 15% | 100.48 | | | 15.07 | @Rs | 3,201.86 | ₹ 48,258.0 |
| 3 | 100 | Earthwork open well excavation all kinds of soil and conveying 3.0m to 4.5 m including near the Collection well 4 | g and de | positing the s | poil with | | | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | 1 | 100.48 | | 1.5 | 13.04 | | | 0 |
| | | Do for item 4All kinds | | | 111 | | | | | |
| | 100.3.7.3 | of soil | 30% | 100.48 | | | 30.14 | @Rs | 565.84 | ₹ 17,057.0 |
| | 100.3.8.3 | Do for item 4Ordinay rock | 30% | 100.48 | | | 30.14 | @Rs | 1,448.56 | ₹ 43,665.0 |
| | OD MR-B8 | | 5% | 100.48 | | | 5.02 | @Rs | 1,794.39 | ₹ 9,015.0 |
| | OD MR-NB8 | | 15% | 100.48 | | | 15.07 | @Rs | 2,408.87 | ₹ 36,306.0 |
| | OD HR-B8 | | 5% | 100.48 | | | 5.02 | @Rs | 2,359.21 | ₹ 11,853.0 |
| | OD HR-NB8 | | 15% | 100.48 | | | 15.07 | @Rs | 3,492.97 | ₹ 52,646.0 |
| 4 | 100 | Earthwork open well excavation kinds of soil and conveying an 4.5m to 6.0 m including neat b | d depos | siting the spoi | | | | | | |
| | | Collection well 1 | 1 | 7.8 | 7.8 | 1.5 | 91.26 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 0.25 | 2.31 | | | |
| | | Say | - | 93.57 | | 0.20 | 2.51 | | | |
| | | | | 95.57 | 111 | | | | | 0 |
| | 100.3.7.4 | Do for item 4All kinds of soil | 30% | 93.57 | | | 28.07 | @Rs | 612.98 | ₹ 17,207.0 |
| | 100.3.8.4 | Do for item 4Ordinay rock | 30% | 93.57 | | | 28.07 | @Rs | 1,569.21 | ₹ 44,049.0 |
| | OD MR-B9 | | 5% | 93.57 | | | 4.68 | @Rs | 1,943.84 | ₹ 9,094.0 |
| | OD MR-NB9 | | 15% | 93.57 | | | 14.04 | @Rs | 2,609.52 | ₹ 36,626.0 |
| | OD HR-B9 | | 5% | 93.57 | | | 4.68 | @Rs | 2,555.71 | ₹ 11,957.0 |
| | OD HR-NB9 | | 15% | 93.57 | | | 14.04 | @Rs | 3,783.92 | ₹ 53,109.0 |
| 5 | 100 | Earthwork open well excavation kinds of soil and conveying and m to 7.5m including neat bank | d depos | | | | | | | |
| | | Collection well 4 | - 1 | 7.6 | 7.6 | 0.15 | 8.66 | | | |
| | | Say | | 8.66 | | | | | | 0 |
| | 100.3.7.5 | Do for item 4All kinds of soil | 30% | 8.66 | | | 2.60 | @Rs | 660.10 | ₹ 1,715.0 |

| | De fan item 4 - Ondines | | | | | | <u> </u> | | |
|----------------|--|--|--|--|--|--|--|--|----------------|
| 100.3.8.5 | Do for item 4Ordinay rock | 30% | 8.66 | | | 2.60 | @Rs | 1,689.94 | ₹ 4,390.0 |
| OD MR-B10 | | 5% | 8.66 | | | 0.43 | @Rs | 2,093.40 | ₹ 906.0 |
| OD MR-NB10 | | 15% | 8.66 | | | 1.30 | @Rs | 2,810.28 | ₹ 3,651.0 |
| OD HR-B10 | | 5% | 8.66 | | | 0.43 | | 2,752.32 | ₹ 1,192.0 |
| OD HR-NB10 | | 15% | 8.66 | | | 1.30 | - | , 4,075.02 | , ₹ 5,293.0 |
| OD III (NDIO | Providing and laying in positi | | | fanasifia | d arodo | | | |) |
| 6 4.1.6 | centering and shuttering - All III): 6 graded stone aggregate | work up | to plinth lev | el : 1:3:6 | | | | | |
| 0 1.1.0 | Collection well 4 | 1 | 7.6 | 7.6 | 0.2 | 11.55 | | | |
| | Inlet chamber | 1 | 4.1 | 2.15 | 0.2 | 1.76 | | | |
| | Total | | 4.1 | 2.13 | 0.2 | 13.31 | | | |
| | Say | | 12.21 | | | | | 5525 0 (00 | 100105.10 |
| 7 | Say | | 13.31 | m | | a | Rs | 7527.0608 | 100185.18 |
| 5.37.1 + 5.34. | concrete work, using Sulphat manufactured in fully automa for all leads, having continuou grade for reinforced cement co site of laying, excluding the co including cost of admixtures i setting of concrete, improve w direction of the Engineer-in-co kg/ ³ .Excess/less cement used | tic batch us agitat oncrete cost of c n recom vorkabil harge. (1 | ing plant and ed mixer, man work, includin entering, shut imended prop ity without im Note :- Cemen | transpor nufacture ng pumpi tering fin ortions as pairing s nt conten | ted to si d as per ng of R ishing a s per IS trength t consid | mix des mix des .M.C. fro and reinfo : 9103 to and dura lered in t | rk in tra ign of s om tran orceme o accele ability a his item | ansit mixer specified sit mixer to nt, erate/ retard as per | |
| | Collection well 1 | | | | | | | | |
| | Bottom slab(3.14/4*(6+0.6+.3 | 1 | 37.37 | | 0.3 | 11.21 | m ³ | | |
| | wall(3.14/4*(6.6^2-6^2))*H | 1 | 5.93 | 0.30 | | 12.04 | | | |
| | Inlet chamber bottom slab | 1 | 3.95 | 1.85 | 0.2 | 1.46 | | | |
| | Inlet chamber wall | 2 | 3.70 | 5.36 | | 7.93 | | | |
| | Inlet chamber wall | 2 | 1.25 | 5.36 | 0.2 | 2.68 | | | |
| | Total | 2 | 1.23 | 5.50 | 0.2 | 35.32 | | | |
| | | | | 3 | | | | | |
| | Say | | 35.32 | m | | a | Rs | 10404.79 | 367497.19 |
| 8 5.37.1 | Providing and laying in positi concrete work, using cement of automatic batching plant and continuous agitated mixer, ma cement concrete work, includ excluding the cost of centerin admixtures in recommended p concrete, improve workability Engineer-in-charge. (Note :- O cum.Excess/less cement used | content a transpor anufactu ing pum g, shutte proportic v withou Cement o | as per approve ted to site of y red as per mix ping of R.M.(cring finishing ons as per IS : t impairing sta content considered | ed design work in tr design of C. from tr and rein 9103 to rength an dered in t | mix, m ransit m of speci ransit m forceme accelera d durab his item | anufactu ixer for a fied grad ixer to si ent, inclu ate/ retard vility as p n is @ 33 | red in f all lead e for re ite of la iding co d settin er direc 0 kg/ | fully s, having inforced ying , ost of g of | |
| 0.07.1 | WELL wall(3.14/4*(6.6^2-6' | 1 | 5.93 | 0.30 | I | 1.78 | | | |
| | Top slab incl.cantilever | | 5.93 | 0.30 | 1.00 | 1./8 | | | |
| | beam $(3.14/4*(6+0.6+2)^2*0.2$ | 1 | 58.06 | | 0.2 | 11.61 | m ³ | | |
| | Main beam | 2 | 6.00 | | 0.2 | 3.60 | | | |
| | Inlet chamber top slab | 1 | 2.80 | 1.85 | 0.2 | 0.56 | | | |
| | Total | | 2.60 | 1.05 | 0.2 | 17.55 | | | |
| | | | | | | 17.33 | | | |
| | Deduction | | | | | | | | |

| | | Manhole | 4 | 0.6 | 0.45 | 0.2 | 0.22 | m ³ | | | |
|----|--------------|---|----------|----------------|----------------|----------------|------------|-------------------|-------------|----|-----------|
| | | Total | - | 0.0 | 0.45 | 0.2 | 0.22 | | | | |
| | | Total after deduction | | | | | 17.33 | | | | |
| | | Say | | 17.33 | m ³ | | | Rs | 10319.094 | | 178829.9 |
| | | Epoxy coated steel reinforcem | ent for | | | straigh | 0 | | | | 17002),) |
| | | placing in position and binding | | | • | • | • | • | • | | |
| 9 | 5.22.6+OD 16 | bars of grade Fe-500D or more | . | | | | | | • | | |
| | | Quantity as per item No.3 | 1 | | 35.32 | | 120.00 | kg/m ³ | 4238.4 | kg | |
| | | Quantity as per item No.4 | 1 | | 17.33 | m ³ | 100.00 | kg/m ³ | 1733 | kg | |
| | | Total | | | | | | | 5971.4 | kg | |
| | | Say | | 5971.4 | kg | | a | Rs | 104.90925 | | 626455.1 |
| 10 | 4.12 | Extra for providing and mixing weight of cement as per manuf | | | | ement co | oncrete w | vork in | doses by | | |
| | | Quantity as per item No.3 | 1 | | 35.32 | | 340.00 | kg/m ³ | 12008.8 | kg | |
| | | Quantity as per item No.4 | 1 | | 17.33 | m ³ | 330.00 | kg/m ³ | 5718.9 | kg | |
| | | Total | | | | | | | 17727.7 | kg | |
| | | Say | | 354.554 | bags | | a | Rs | 70.77 | | 25090.01 |
| 11 | 5.9.1 | Centering and shuttering inclu- Foundations, footings, bases of | | | | | oval of fo | orm for | | | |
| | | well Bottom slab(3.14*D*H) | 1 | 20.724 | | 0.3 | 6.22 | m ² | | | |
| | | Total | | | | | 6.22 | m ² | | | |
| | | Say | | 6.22 | m ² | | a | Rs | 350.00369 | | 2176.04 |
| 12 | 5.9.2 | Centering and shuttering inclu- thickness) including attached p For well walls outside(3.14*D*H) | - | | - | d string | | etc. | :Walls (any | | |
| | | Forwell walls inside(3.14*d* | 1 | 18.84 | | | 127.36 | | | | |
| | | Inlet chamber wall | 4 | 4.9 | | | 105.06 | | | | |
| | | Total | | | | | 372.51 | | | | |
| | | Say | | 372.50864 | m ² | | | Rs | 748.62294 | | 278868.51 |
| 13 | 5.9.3 | Centering and shuttering inclu- floors, roofs, landings, balconi | • | utting, propp | ing etc. a | nd remo | oval of fo | orm for | :Suspended | | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 8.6 | 27.00 | m ² | | | |
| | | Beam side | 4 | 6 | | 0.45 | 10.80 | | | | |
| | | inlet chamber top slab | 1 | 2.8 | | 1.85 | 5.18 | | | | |
| | | Total | | | | | 42.98 | m ² | | | |
| | | Say | | 42.984 | m ² | | a | Rs | 851.51525 | | 36601.53 |
| 14 | 2.25 | Filling available excavated ear in layers not exceeding 20cm i watering, lead up to 50 m and | n depth | , consolidatin | | | | | | | |
| | | Quantity as per item (all kind of soil) | 1 | | | | 121.10 | | | | |
| | | Say | | 121.10 | m ³ | | a | Rs | 269.89771 | | 32684.88 |
| | | | | | | | | | | | |

| | | Providing and applying integra | | | | | | | | |
|----|---------|---|---------------------------|--|--|-----------|--|--|------------------------|----------|
| | | treatment to the RCC structure podiums, reservior, sewage & | | - | | | | | | |
| | | prepared by mixing in the ratio | | | | | | | | |
| | | vertical surfaces and 3 : 1 (3 pa | | | | | | | | |
| | | surfaces and applying the same | | | | | - | - | | |
| | | brush. The material shall meet | | | | | | | | |
| | | reducing permeability of concr DIN 1048 and resistant to 16 b | | | | | | | * | |
| | | shall be capable of self-healing | - | - | - | | | - | - | |
| | | out all complete as per specific | | | | | | | | |
| | | performance shall carry guarar | tee for | 10 years agai | nst any le | akage. | For verti | cal sur | face two | |
| 15 | 22.23.1 | coats @ 0.70 kg per sqm | | | | | | 2 | | |
| | | Inside of walls(3.14*d*h) | 1 | 18.84 | | 6.76 | | | | |
| | | Total | | | 2 | | 127.36 | | | |
| | | Say | | 127.3584 | | | 0 | Rs | 595.27518 | 75813.29 |
| 16 | 22.23.2 | Providing and applying integra treatment to the RCC structure | | | | | | | | |
| | | podiums, reservior, sewage & | | | | | | | | |
| | | prepared by mixing in the ratio | | | | | | | | |
| | | vertical surfaces and 3 : 1 (3 pa | arts inte | gral crystallin | ne slurry : | 1 part | water) fo | r horiz | zontal | |
| | | surfaces and applying the same | | | | | - | - | | |
| | | brush. The material shall meet | | | | | | | | |
| | | reducing permeability of concr DIN 1048 and resistant to 16 b | | | | | | | | |
| | | shall be capable of self-healing | | | | | | | | |
| | | out all complete as per specific | | | | | | | | |
| | | performance shall carry guarar | tee for | 10 years agai | nst any le | akage. | For horiz | zontal s | surface one | |
| | | coat @1.10 kg per sqm. | | | | | | | | |
| | | Bottom slab(3.14*d) | 1 | 18.84 | | | 18.84 | m ² | | |
| | | Total | | | | | 18.84 | m ² | | |
| | | Say | | 18.84 | m ² | | | Rs | 458.7695 | 8643.22 |
| | | | | | | | | - | - | |
| 17 | 13.7.1 | 12 mm cement plaster finished | with a | floating coat | of neat ce | ement : 1 | :3 (1 cer | nent : 1 | 3 fine sand) | |
| | | Inside of walls(3.14*d*h) | 1 | 18.84 | | 6.76 | 127.36 | | | |
| | | Bottom slab(3.14*d) | 1 | 18.84 | | | 18.84 | m ² | | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 8.6 | 27.00 | | | |
| | | Inlet chamber walls(total leng | 1 | 10.75 | | 5.36 | 57.62 | m2 | | |
| | | Total | | | | | 230.82 | | | |
| | | | | | | | | | | |
| | | Deduction | | | | | | 2 | | |
| | | | 4 | 0.6 | 0.45 | | 1.08 | m | | |
| | | Manhole | 4 | 0.6 | 0.45 | | 1.08 | | | |
| | | Manhole Total | 4 | 0.6 | 0.45 | | 1.08 | m ² | | |
| | | Manhole Total Total after deduction | 4 | | | | 1.08 229.74 | m ² m ² | 418 78727 | 96213-10 |
| 18 | 19 18 1 | Manhole Total Total after deduction Say | | 229.7424 | m ² | ·455x6 | 1.08 229.74 @ | m ² m ² Rs | 418.78727 | 96213.19 |
| 18 | 19.18.1 | Manhole Total Total after deduction | er witho | 229.7424 ut frame for r | m ² manholes | | 1.08 229.74 @ | m ² m ² Rs | | 96213.19 |
| 18 | 19.18.1 | Manhole Total Total after deduction Say Supplying and fixing C.I. cove | er witho | 229.7424 ut frame for r | m ² manholes | | 1.08 229.74 @ 10 mm re | m ² m ² Rs ectangu | | 96213.19 |
| 18 | 19.18.1 | Manhole Total Total after deduction Say Supplying and fixing C.I. cove cover (light duty) the weight o | er witho | 229.7424 ut frame for r ver to be not | m ² nanholes less than | | 1.08 229.74 @ 10 mm re 1.00 | m ² m ² Rs ectangu No. | ılar C.I. | |
| 18 | 19.18.1 | Manhole Total Total after deduction Say Supplying and fixing C.I. cove | er witho f the co 4 | 229.7424 ut frame for r ver to be not 4 | m ² nanholes less than No. | 23 kg | 1.08 229.74 @ 10 mm re 1.00 @ | m ² m ² Rs ectangu No. Rs | alar C.I. 1629.5057 | 96213.19 |

| | | For walls outside(3.14*D*H) | 1 | 20.724 | | 6.76 | 140.09 | | | |
|----------|-----------|--|---|---|---|--|---|---|--|-----------------|
| | | Say | | 140.09424 | | |) | Rs | 61.777845 | 8654.72 |
| 20 | 13.52.2 | Finishing with Epoxy paint (tw manufacturer's specifications i complete. On concrete work | | | | | | | | |
| | | Quantity as per item code 13.7.1 | 1 | 229.7424 | | | 0.00 | | 229.7424 | |
| | | Say | | 229.7424 | m2 | | a | Rs | 232.67532 | 53455.39 |
| 21 | 19.16 | Providing orange colour safety 10910 on 12 mm dia steeel ba mm x 25 mm and over all min mm space between protruded besides necessary and adequat drawing and suitable to with s specifications and having man fixing including fixing in man 3 coarse sand: 6 graded stone | r confor imum le legs hav e ancho tand the ufacture holes w | ming to IS:17 ength 263 mm ring 2 mm trea ring projection bend test and es permanent ith 30x20x15 | 786, havi and wid ad on top ons on tai d chemica identifica cm ceme | ng minit hth as 16 surface 1 length al resistant ation ma ent conc | mum cro 5 mm wi by ribbi on 138 r ance test urk to be rete bloc | ss secti ith min ng or c nm as as per visible k 1:3:6 | ion as 23 imum 112 chequering per standard even after 5 (1cement: | |
| | | well | 21 | | | | 21.00 | No | | |
| | | Inlet chamber | 16 | | | | 16.00 | | | |
| | | | 10 | 25 | NT | | | | 5 (0.05004 | 210.40.55 |
| | | Say | | | No. | |) | Rs | 568.87984 | 21048.55 |
| 22 | 10.26.3 | Providing and fixing hand rail railing, staircase railing and si primer. | | | | | | | | |
| | | 50mm dia G.I5.17kg/m , 32 | mm dia | GI-3.17kg/m | | | | | | |
| | | Outer total-23m/1m c/c vertical 50mm dia | 27 | | | 0.75 | 5.17 | ka | 104.6925 | |
| | | Horizontal 0.25m c/c-32mm dia | 3 | 27 | | 0.75 | 3.17 | | 256.77 | |
| | | | 5 | | 1 | | | | | 50100.40 |
| | | Say | | 361.4625 | ÷ | |) | Rs | 194.17916 | 70188.48 |
| 23 | 13.48.3 | Finishing with Deluxe Multi s manufacturers specifications: | urface p | ant system i | | | | using p | orimer as per | |
| | | vertical pipe | 27 | 0.75 | | 0.05 | 1.01 | m2 | | |
| | | Horizontal pipe | 3 | 27 | | 0.032 | 2.59 | m2 | | |
| | | Say | | 3.60 | m2 | | a, | Rs | 154.62153 | 557.33 |
| 24 | 100.36.1 | Filling water with 5000 litre ta (average) to the reservoir site m using 5 HP diesel engine pu of water etc. complete. | and pun | nping the wate | er into th | e reserv | oir of he | ight no | t less than 3 | |
| | | | 1 | 28.26 | | 5.76 | 162.78 | m3 | | |
| | | Say | - | 1627.78 | Kilo litr | | | Rs | 218.94691 | 356396.53 |
| | | Total-collec | tion w | | | | u | | -13021021 | ₹ 3,004,051.10 |
| COT | LECTION W | | aon we | ,11 T | | | | | I | \$ 3,004,031.10 |
| Ite | LECTION W | | | | | | | | | |
| m No. | Item Code | Description | No | L | В | Н | v | Unit | Rate | Amount |
| 1 | 100.00 | Earthwork open well excavational kinds of soil and conveying 1.5 m including neat banking. 1092 | on (abo g and de | ve water) for positing the s | wells of o poil with | lia. abo in initia | l lead of | and up 50m a | to 9.0 m in nd lift up to | |

| | | Collection well 5 | 1 | 8.6 | 8.6 | 1.5 | 110.94 | | | |
|---|-----------|---|----------|-----------------|----------------|-----|--------|-----|----------|------------|
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | 1 | 124.78 | | 1.5 | 15.04 | | | <u> </u> |
| | 100.3.7.1 | Do for item 4All kinds of soil | 30% | 124.78 | | | 37.43 | @Rs | 471.51 | ₹ 17,651.0 |
| | 100.3.8.1 | Do for item 4Ordinay rock | 30% | 124.78 | | | 37.43 | @Rs | 1,207.11 | ₹ 45,187.0 |
| | OD MR-B6 | | 5% | 124.78 | | | 6.24 | @Rs | 1,495.29 | ₹ 9,329.0 |
| | OD MR-B7 | | 15% | 124.78 | | | 18.72 | @Rs | 2,007.35 | ₹ 37,572.0 |
| | OD MR-B8 | | 5% | 124.78 | | | 6.24 | @Rs | 1,965.96 | ₹ 12,266.0 |
| | OD MR-B9 | | 15% | 124.78 | | | 18.72 | @Rs | 2,910.76 | ₹ 54,481.0 |
| 2 | 100 | Earthwork open well excavation all kinds of soil and conveying 1.5m to 3.0 m including neat b | g and de | positing the s | | | | | | |
| | | Collection well 5 | 1 | 8.6 | 8.6 | 1.5 | 110.94 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 124.78 | m ³ | | | | | |
| | 100.3.7.2 | Do for item 4All kinds of soil | 30% | 124.78 | | | 37.43 | @Rs | 518.64 | ₹ 19,415.0 |
| | 100.3.8.2 | Do for item 4Ordinay rock | 30% | 124.78 | | | 37.43 | @Rs | 1,327.83 | ₹ 49,706.0 |
| | OD MR-B7 | | 5% | 124.78 | | | 6.24 | @Rs | 1,644.85 | ₹ 10,262.0 |
| | OD MR-NB7 | | 15% | 124.78 | | | 18.72 | @Rs | 2,208.11 | ₹ 41,329.0 |
| | OD HR-B7 | | 5% | 124.78 | | | 6.24 | @Rs | 2,162.58 | ₹ 13,492.0 |
| | OD HR-NB7 | | 15% | 124.78 | | | 18.72 | | 3,201.86 | ₹ 59,929.0 |
| 3 | 100 | Earthwork open well excavation all kinds of soil and conveying 3.0m to 4.5 m including near b | g and de | positing the s | | | | | | |
| | | Collection well 5 | 1 | 8.6 | 8.6 | 1.5 | 110.94 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 124.78 | m ³ | | | | | 0 |
| | 100.3.7.3 | Do for item 4All kinds of soil | 30% | 124.78 | | | 37.43 | @Rs | 565.84 | ₹ 21,182.0 |
| | 100.3.8.3 | Do for item 4Ordinay rock | 30% | 124.78 | | | 37.43 | | 1,448.56 | ₹ 54,225.0 |
| | OD MR-B8 | | 5% | 124.78 | | | 6.24 | @Rs | 1,794.39 | ₹ 11,195.0 |
| | OD MR-NB8 | | 15% | 124.78 | | | 18.72 | | 2,408.87 | ₹ 45,087.0 |
| | OD HR-B8 | | 5% | 124.78 | | | 6.24 | @Rs | 2,359.21 | ₹ 14,719.0 |
| | OD HR-NB8 | | 15% | 124.78 | | | 18.72 | | 3,492.97 | ₹ 65,378.0 |
| 4 | 100 | Earthwork open well excavation kinds of soil and conveying an 4.5m to 6.0 m including neat b | nd depo | siting the spoi | | | | | | |
| | | Collection well 5 | 1 | 8.6 | 8.6 | 1.5 | 110.94 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.5 | 13.84 | | | |
| | | Say | | 124.78 | | | | | | 0 |
| | 100.3.7.4 | Do for item 4All kinds of soil | 30% | 124.78 | | | 37.43 | @Rs | 612.98 | ₹ 22,946.0 |
| | 100.3.8.4 | Do for item 4Ordinay rock | 30% | 124.78 | | | 37.43 | @Rs | 1,569.21 | ₹ 58,742.0 |

| | OD MR-B9 | | 5% | 124.78 | | | 6.24 | @Rs | 1,943.84 | ₹ 12,128.0 |
|---|-----------------|---|--|--|--|--|---|--|--|---|
| | OD MR-NB9 | | 15% | 124.78 | | | 18.72 | @Rs | 2,609.52 | ₹ 48,842.0 |
| | OD HR-B9 | | 5% | 124.78 | | | 6.24 | @Rs | 2,555.71 | ₹ 15,945.0 |
| | OD HR-NB9 | | 15% | 124.78 | | | 18.72 | @Rs | 3,783.92 | ₹ 70,824.0 |
| | | Earthwork open well excavation | | | | | | | | |
| _ | 100 | kinds of soil and conveying an | | siting the spoi | l within i | nitial le | ad of 50 | m and l | ift from 6 | |
| 5 | | m to 7.5m including neat bank | ing. | | | | | 1 | | |
| | | Collection well 5 | 1 | 8.6 | 8.6 | 0.15 | 11.09 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.25 | 1.28 | 11.81 | | | |
| | | Say | | 22.9 | m ³ | | | | | 0 |
| | 100.3.7.5 | Do for item 4All kinds of soil | 30% | 22.9 | | | 6.87 | @Rs | 660.10 | ₹ 4,535.0 |
| | 100.3.8.5 | Do for item 4Ordinay rock | 30% | 22.9 | | | 6.87 | @Rs | 1,689.94 | ₹ 11,610.0 |
| | OD MR-B10 | | 5% | 22.9 | | | 1.15 | @Rs | 2,093.40 | ₹ 2,397.0 |
| | OD MR-NB10 | | 15% | 22.9 | | | 3.44 | @Rs | 2,810.28 | ₹ 9,653.0 |
| | OD HR-B10 | | 5% | 22.9 | | | 1.15 | @Rs | 2,752.32 | ₹ 3,151.0 |
| | OD HR-NB10 | | 15% | 22.9 | | | 3.44 | | 4,075.02 | ₹ 13,998.0 |
| 6 | 4.1.6 | centering and shuttering - All III): 6 graded stone aggregate | - | - | | | | oarse sa | and (zone- | |
| | | Collection well 2 | 1 | 8.6 | 8.6 | 0.2 | 14.79 | | | |
| | | Inlet chamber | 1 | 4.1 | 2.15 | 0.2 | 1.76 | | | |
| | | | | | | | | | | |
| | | Total | | | | | 16.55 | | | |
| 7 | 5.37.1 + 5.34.1 | Say | | 16.55 | m ³ | | 16.55 @ | m ³ Rs | 7527.0608 | |
| 7 | 5.37.1 + 5.34.1 | Say Providing and laying in position Sulphate Resistant Cement (1) plant and transported to site of per mix design of specified gra- mixer to site of laying , exclude admixtures in recommended p without impairing strength and considered in this item is @ 33 Collection well 1 Bottom slab(3.14/4*(7+0.6+.3)^2*0. | SRC) c E work i ade for ling the roportion 1 durable 30 kg/ ³ . | y mixed M-30 ontent as per a n transit mixe reinforced cen cost of center ons as per IS : ility as per dire Excess/less ce | m ³ grade cc approved r for all l nent cond ing, shut 9103 to ection of | oncrete s design eads, ha crete wo tering fi accelera the Eng ed as pe | 16.55 @ for reinformix, man aving com- pork, inclu- inishing a ate/ retard gineer-in- r design t | m ³ Rs prced ce nufactu ttinuou ding pu and rein d settin charge mix is p | ement concre red in fully a s agitated mi imping of R. nforcement, i g of concrete . (Note :- Ce | automatic batching xer, manufactured as M.C. from transit ncluding cost of e, improve workability ment content |
| 7 | 5.37.1 + 5.34.1 | Say Providing and laying in positio Sulphate Resistant Cement (plant and transported to site of per mix design of specified gra mixer to site of laying , exclud admixtures in recommended p without impairing strength and considered in this item is @ 3: Collection well 1 Bottom slab(3.14/4*(7+0.6+.3)^2*0. 3 wall(3.14/4*(7.6^2-7^2))*H | SRC) c work i ade for ling the roportic | y mixed M-30 ontent as per a n transit mixe reinforced cen cost of center ons as per IS : ility as per dir Excess/less ce | m ³ grade cc approved r for all l nent cond ing, shut 9103 to ection of | oncrete : design eads, ha crete wo tering fi accelera the Eng ed as pe 0.3 | 16.55 @ for reinformix, main aving comport, incluinishing a atte/ retardor gineer-in- r design to 14.70 17.60 | m ³ Rs nufactu tinuou ding pu and rein d settin -charge mix is j m ³ m ³ | ement concre red in fully a s agitated mi imping of R. nforcement, i g of concrete . (Note :- Ce | te work, using automatic batching xer, manufactured as M.C. from transit ncluding cost of e, improve workability ment content |
| 7 | 5.37.1 + 5.34.1 | Say Providing and laying in position Sulphate Resistant Cement (plant and transported to site of per mix design of specified gra mixer to site of laying, exclud admixtures in recommended p without impairing strength and considered in this item is @ 33 Collection well 1 Bottom slab(3.14/4*(7+0.6+.3)^2*0. 3 | SRC) c work i ade for ling the roportion d durabi 30 kg/ ³ . | y mixed M-30 ontent as per a n transit mixe reinforced cen cost of center ons as per IS : ility as per dir Excess/less ce 48.99 | m ³ grade co approved r for all l nent cond ing, shut 9103 to ection of ement use | oncrete : design eads, ha crete wo tering fi accelera the Eng ed as pe 0.3 | 16.55 @ for reinformix, main aving comport, incluinishing a tate/ retard gineer-in- r design = 14.70 17.60 1.46 | m ³ Rs preed ce nufactu tinuou ding pu and rein d settin charge mix is p m ³ m ³ m ³ | ement concre red in fully a s agitated mi imping of R. nforcement, i g of concrete . (Note :- Ce | te work, using automatic batching xer, manufactured as M.C. from transit ncluding cost of e, improve workability ment content |
| 7 | 5.37.1 + 5.34.1 | Say Providing and laying in positio Sulphate Resistant Cement (plant and transported to site of per mix design of specified gra mixer to site of laying , exclud admixtures in recommended p without impairing strength and considered in this item is @ 3: Collection well 1 Bottom slab(3.14/4*(7+0.6+.3)^2*0. 3 wall(3.14/4*(7.6^2-7^2))*H | SRC) c work i ade for ling the roportion 1 durabit 30 kg/ ³ . | y mixed M-30 ontent as per a n transit mixe reinforced cen cost of center ons as per IS : ility as per dirr Excess/less ce 48.99 6.88 | m ³ grade co approved r for all h nent cond ing, shut 9103 to ection of ement use 0.30 | oncrete s design eads, ha crete wo tering ff accelera the Eng ed as pe 0.3 8.53 | 16.55 @ for reinformix, main aving comport, incluinishing a tate/ retard gineer-in- r design = 14.70 17.60 1.46 | m ³ Rs preed ce nufactu tinuou ding pu and rein d settin charge mix is p m ³ m ³ m ³ | ement concre red in fully a s agitated mi imping of R. nforcement, i g of concrete . (Note :- Ce | te work, using automatic batching xer, manufactured as M.C. from transit ncluding cost of e, improve workability ment content |
| 7 | 5.37.1 + 5.34.1 | Say Providing and laying in positic Sulphate Resistant Cement (plant and transported to site of per mix design of specified gra mixer to site of laying, exclud admixtures in recommended p without impairing strength and considered in this item is @ 3: Collection well 1 Bottom slab(3.14/4*(7+0.6+.3)^2*0. 3 wall(3.14/4*(7.6^2-7^2))*H Inlet chamber bottom slab | SRC) c work i ade for ling the roportion 1 durable 30 kg/ ³ . 1 1 1 | y mixed M-30 ontent as per a n transit mixe reinforced cen cost of center ons as per IS : ility as per dire Excess/less ce 48.99 6.88 3.95 | m ³ grade co approved r for all l nent conc ing, shut 9103 to ection of ement use 0.30 1.85 | oncrete to design eads, ha crete wo tering fi accelera the Eng ed as pe 0.3 8.53 0.2 | 16.55 @ for reinformix, main aving comport, incluinishing a ate/ retard gineer-in- r design a 14.70 17.60 1.46 10.77 | m ³ Rs nufactu ding pu and rein d settin -charge mix is j m ³ m ³ m ³ m ³ | ement concre red in fully a s agitated mi imping of R. nforcement, i g of concrete . (Note :- Ce | te work, using automatic batching xer, manufactured as M.C. from transit ncluding cost of e, improve workability ment content |
| 7 | 5.37.1 + 5.34.1 | Say Providing and laying in position Sulphate Resistant Cement (C plant and transported to site of per mix design of specified gra mixer to site of laying, exclud admixtures in recommended p without impairing strength and considered in this item is @ 32 Collection well 1 Bottom slab(3.14/4*(7+0.6+.3)^2*0. 3 wall(3.14/4*(7.6^2-7^2))*H Inlet chamber bottom slab Inlet chamber wall | SRC) c work i ade for ling the roportion 1 durabit 30 kg/ ³ . 1 1 1 2 | y mixed M-30 ontent as per a n transit mixe reinforced cent cost of center ons as per IS : ility as per dir Excess/less ce 48.99 6.88 3.95 3.70 | m ³ grade cc approved r for all 1 nent conc ing, shut 9103 to ection of ement use 0.30 1.85 7.28 | oncrete : design eads, ha crete wo tering fi accelera the Eng cd as pe 0.3 8.53 0.2 | 16.55 @ for reinformix, main aving comport, incluinishing a tate/ retard gineer-in- r design = 14.70 17.60 1.46 | m ³ Rs preed ce nufactu tinuou ding pu and rein d settin charge mix is j m ³ m ³ m ³ m ³ m ³ | ement concre red in fully a s agitated mi imping of R. nforcement, i g of concrete . (Note :- Ce | te work, using automatic batching xer, manufactured as M.C. from transit ncluding cost of e, improve workability ment content |

| | | Providing and laying in positio | | | | | | | | | |
|----|--------------|---|-----------|----------------|----------------|----------------|------------|-------------------|--------------|----|-----------|
| | | concrete work, using cement co | | | | | | | | | |
| | | automatic batching plant and the continuous agitated mixer, man | | | | | | | | | |
| | | cement concrete work, includin | | | | | | | | | |
| | | excluding the cost of centering | | | | | | | | | |
| | | admixtures in recommended pu | | | | | | | | | |
| | | concrete, improve workability Engineer-in-charge. (Note :- C | | | | | | | ction of the | | |
| 8 | 5.37.1 | cum.Excess/less cement used a | | | | | | | | | |
| | | WELL wall(3.14/4*(6.6^2- | | | - | | | | | | |
| | | 6^2))*H | 1 | 17.08 | 0.30 | 1.00 | 5.12 | m ³ | | | |
| | | Top slab incl.cantilever | 1 | 17.00 | 0.50 | 1.00 | 5.12 | | | | |
| | | beam $(3.14/4*(7+0.6+2)^2*0.$ | | | | | | | | | |
| | | 2 | 1 | 72.35 | | 0.2 | 14.47 | m ³ | | | |
| | | Main beam | 2 | 7.00 | | 0.3 | 4.20 | m3 | | | |
| | | Inlet chamber top slab | 1 | 2.80 | 1.85 | 0.2 | 0.56 | | | | |
| | | Inlet chamber wall | 2 | 3.70 | 1.00 | 0.2 | 1.48 | | | | |
| | | Inlet chamber wall | 2 | 1.25 | 1.00 | 0.2 | 0.50 | | | | |
| | | Total | | | | | 24.35 | m ³ | | | |
| | | Deduction | | | | | | | | | |
| | | Manhole | 4 | 0.6 | 0.45 | 0.2 | 0.22 | | | | |
| | | Total | | | | | 0.22 | | | | |
| | | Total less deduction | | | | | 24.13 | m ³ | | | |
| | | Say | | 24.13 | m ³ | | a | Rs | 10319.094 | | 248999.73 |
| | | Epoxy coated steel reinforceme | ent for l | R.C.C. work i | ncluding | straigh | tening, c | utting, | bending, | | |
| | | placing in position and binding | g all cor | | | | | | | | |
| 9 | 5.22.6+OD 16 | bars of grade Fe-500D or more | e. | | | 2 | | <u> </u> | | | |
| | | Quantity as per item No.3 | 1 | | 48.17 | | 120.00 | | | - | |
| | | Quantity as per item No.4 | 1 | | 24.13 | m' | 100.00 | kg/m³ | 2413 | kg | |
| | | Total | | | | | | | 8193.4 | kg | |
| | | Say | | 8193.4 | | manta | o morato v | Rs | 104.90925 | | 859563.45 |
| 10 | 4.12 | weight of cement as per manuf | | | | | Jincrete V | VOIK IN | uoses by | | |
| | | Quantity as per item No.3 | 1 | r | 48.17 | m ³ | 340.00 | kg/m ³ | 16377.8 | kg | |
| | | Quantity as per item No.4 | 1 | | 24.13 | | 330.00 | | | - | |
| | | Total | | | | | 220.00 | | 24340.7 | | |
| | | Say | | 486.814 | bags | | Ø | Rs | 70.77 | 0 | 34449.39 |
| | | Centering and shuttering inclu | din a ata | | Ū. | ndress | | | | | |
| 11 | 5.9.1 | :Foundations, footings, bases of | U | 0,1 11 | U | | oval of fo | orm for | | | |
| 11 | 0.7.1 | well Bottom slab(3.14*D*H) | 1 | 23.864 | | 0.3 | 7.16 | m ² | | | |
| | | Total | 1 | 23.004 | | 0.5 | 7.16 | | | | |
| | | Say | | 7.16 | m^2 | | | Rs | 350.00369 | | 2505.75 |
| | | Suj | | 7.10 | 1 | 1 | W | 105 | 000000000 | | 2000.10 |
| | | Centering and shuttering inclu | ding str | utting, proppi | ing etc. a | nd remo | oval of fo | orm for | :Walls (any | | |
| 12 | 5.9.2 | thickness) including attached p | • | U. 1 1 1 | • | nd string | courses | etc. | | | |
| | | outside(3.14*D*H) | 1 | 23.864 | | 9.53 | 227.42 | m ² | | | |
| | | Forwell walls inside(3.14*d* | 1 | 21.98 | | 8.53 | 187.49 | | | | |
| | | Inlet chamber wall | 4 | 4.9 | | 8.28 | 162.29 | m ² | | | |

| | | Total | | | | | 577.20 | m ² | | |
|----|---------|--|---|---|---|--|---|---|--|-----------|
| | | Say | | 577.20132 | m^2 | | | Rs | 748.62294 | 432106.15 |
| | | | | | | 1 | | | | 452100.15 |
| 13 | 5.9.3 | Centering and shuttering includ floors, roofs, landings, balconie | | | | ind remo | | | Suspended | |
| | | Top slab (3.14*D) | 1 | 3.14 | | 9.6 | 30.14 | m^2 | | |
| | | Beam side | 4 | 7 | | 0.5 | 14.00 | m2 | | |
| | | inlet chamber top slab | 1 | 2.8 | | 1.85 | 5.18 | m2 | | |
| | | Total | | | | | 49.32 | m ² | | |
| | | Say | | 49.324 | m^2 | | | Rs | 851.51525 | 42000.14 |
| | | Filling available excavated eart | h (excl | | | es plinth | | | | |
| | | in layers not exceeding 20cm in | · · | • / | | • | - | | | |
| 14 | 2.25 | watering, lead up to 50 m and 1 | - | | e | | 5 5 | | U | |
| | | Quantity as per item (all kind | | | | | | | | |
| | | of soil) | 1 | | | | 156.61 | m | | |
| | | Say | | 156.61 | m ³ | | a | Rs | 269.89771 | 42267.6 |
| 15 | 22.23.1 | treatment to the RCC structures podiums, reservior, sewage & v prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pa surfaces and applying the same brush. The material shall meet t reducing permeability of concre DIN 1048 and resistant to 16 ba shall be capable of self-healing out all complete as per specifica performance shall carry guarant coats @ 0.70 kg per sqm | vater tr of 5 : 2 rts inte from r the req ete by 1 ar hydr of crac ation a | eatment plant 2 (5 parts inte gral crystallin negative (inter uirements as more than 909 ostatic pressu cks up to a wi nd the direction | t, tunnels gral crys ne slurry (nal) side specified (6 compa tre on ne dth of 0. on of the | s / subwa stalline s : 1 part e with th in ACI ured with gative si 50mm. T e enginee | y and br lurry : 2 water) fo e help of 212-3R- control de. The cr-in-cha | ridge de parts w or horiz Synthe 2010 i. concre crystall c shall l rge. Th | eck etc., vater) for contal etic fiber e by te as per ine slurry be carried e product | |
| | | Inside of walls(3.14*d*h) | 1 | 21.98 | | 8.53 | 187.49 | m^2 | | |
| | | Total | | | | | 187.49 | m ² | | |
| | | Say | | 187.4894 | m^2 | | | Rs | 595.27518 | 111607.79 |
| 10 | 22.23.2 | Providing and applying integral treatment to the RCC structures podiums, reservior, sewage & v prepared by mixing in the ratio vertical surfaces and 3 : 1 (3 pa surfaces and applying the same brush. The material shall meet to reducing permeability of concre- DIN 1048 and resistant to 16 ba shall be capable of self-healing out all complete as per specifica performance shall carry guarant coat @1.10 kg per sqm. | s like re vater tr of 5 : 2 rts inte from r the req ete by r ar hydr of crac ation a | etaining walls eatment plant 2 (5 parts inte gral crystallin negative (inter uirements as more than 909 ostatic pressu cks up to a wi nd the direction | of the b s, tunnels gral crys he slurry mal) side specified % compa- ure on ne dth of 0. on of the | asement, s / subwa stalline s : 1 part e with the in ACI irred with gative si 50mm. T e enginee | , water ta ny and br lurry : 2 water) for e help of 212-3R- control de. The Che work er-in-cha | anks, ro idge de parts wo r horiz synthe 2010 i. concre crystall c shall l rge. Th | oof slabs, eeck etc., vater) for contal etic fiber e by te as per ine slurry be carried e product | |
| | | Bottom slab(3.14*d) | 1 | 21.98 | | | 21.98 | m ² | | |
| | | Total | | | | | 21.98 | | | |
| | | Say | | 21.98 | m ² | | | Rs | 458.7695 | 10083.75 |
| 17 | 13.7.1 | 12 mm cement plaster finished | with a | | | ement · 1 | | | | |
| 1/ | 13.7.1 | Inside of walls(3.14*d*h) | 1 viui a | | or near c | 1 1 | 209.47 | | | |
| | | | 1 | 21.98 | | 9.53 | | | | |
| | | Bottom slab(3.14*d) | 1 | 21.98 | | | 21.98 | ш | | |

| | | Top slab $(2.14*D)$ | 1 | 3.14 | | 9.6 | 30.14 | m^2 | | |
|----|---------|--|---|---|---|---|---|--|---|-------------|
| | | Top slab (3.14*D) | 1 | | | | | | | |
| | | Inlet chamber walls(total leng | 1 | 10.75 | | 8.28 | 89.01 | | | |
| | | Total | | | | | 350.60 | m | | |
| | | Deduction | | | | | | 2 | | |
| | | Manhole | 4 | 0.6 | 0.45 | | 1.08 | | | |
| | | Total | | | | | 1.08 | | | |
| | | Total after deduction | | | | | 349.52 | m ² | | |
| | | Say | | 349.5234 | m ² | | a | Rs | 418.78727 | 146375.95 |
| 18 | 19.18.1 | Supplying and fixing C.I. co cover (light dut | | | | | | | gular C.I. | |
| | | | 4 | | | | 1.00 | No. | | |
| | | Say | | 4 | No. | | a | Rs | 1629.5057 | 6518.02 |
| 19 | 13.59 | Coal tarring two coats on new coat and second coat respectiv | | sing 0.16 litre | and 0.12 | litre co | oal tar pe | r sqm i | n the first | |
| | | For walls outside(3.14*D*H) | 1 | 23.864 | | 8.53 | 203.56 | | | |
| | | Say | | 203.55992 | m2 | | | Rs | 61.777845 | 12575.49 |
| 20 | 13.52.2 | Finishing with Epoxy paint (tw manufacturer's specifications in complete. On concrete work | | | | | | | | |
| | | Quantity as per item code 13.7.1 | 1 | 349.5234 | | | 0.00 | | 349.5234 | |
| | | Say | | 349.5234 | m2 | | | Rs | 232.67532 | 81325.47 |
| 21 | 19.16 | 10910 on 12 mm dia steeel bar mm x 25 mm and over all mini mm space between protruded I besides necessary and adequate drawing and suitable to with st specifications and having mani fixing including fixing in mani 3 coarse sand: 6 graded stone a | imum le legs hav e ancho tand the ufacture holes w | ength 263 mm ring 2 mm trea ring projectio bend test and es permanent ith 30x20x15 | and wid ad on top ons on tail d chemica identifica cm ceme | th as 16 surface l length ll resista tion ma nt conc | 5 mm wi by ribbi on 138 r ance test rk to be rete bloc | ith min ng or c nm as j as per visible k 1:3:6 | imum 112 hequering per standard even after (1cement: | |
| | | .11 | 20 | | | | 20.00 | NT. | | |
| | | well Inlet showher | 30 | | | | 30.00 26.00 | | | |
| | | Inlet chamber | 26 | | | | | INO. | | |
| | | C. | | | N. | | | | 5 (0.0500) | 240 |
| | | Say Providing and fixing hand rail | of appr | | No. welding e | te to st | a | Rs | 568.87984 | 31857.27 |
| 22 | 10.26.3 | Say Providing and fixing hand rail railing, staircase railing and sin primer. | | oved size by | welding e | | @ eel ladde | Rs er railin | g, balcony | 31857.27 |
| 22 | 10.26.3 | Providing and fixing hand rail railing, staircase railing and si | milar w | oved size by orks, includin | welding e g applyin | | @ eel ladde | Rs er railin | g, balcony | 31857.27 |
| 22 | 10.26.3 | Providing and fixing hand rail railing, staircase railing and sin primer. 50mm dia G.I5.17kg/m , 32r Outer total-23m/1m c/c | milar w | oved size by orks, includin | welding e g applyin | | @ eel ladde | Rs er railin | g, balcony | 31857.27 |
| 22 | 10.26.3 | Providing and fixing hand rail railing, staircase railing and sin primer. 50mm dia G.I5.17kg/m , 32r Outer total-23m/1m c/c vertical 50mm dia | milar w | oved size by orks, includin | welding e g applyin | | @ eel ladde | Rs er railin of appro | g, balcony | 31857.27 |
| 22 | 10.26.3 | Providing and fixing hand rail railing, staircase railing and sin primer. 50mm dia G.I5.17kg/m , 32r Outer total-23m/1m c/c | milar w | oved size by orks, includin | welding e g applyin | ıg primi | @ eel ladde ng coat o | Rs er railin of appro kg | g, balcony oves steel | 31857.27 |
| 22 | 10.26.3 | Providing and fixing hand rail railing, staircase railing and sin primer. 50mm dia G.I5.17kg/m , 32r Outer total-23m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say | milar we | oved size by v orks, includin GI-3.17kg/m 30 401.625 | welding e g applyin | g primi 0.75 | @ eeel ladde ng coat c 5.17 3.17 @ | Rs er railin of appro kg kg Rs | g, balcony oves steel 116.325 285.3 194.17916 | 31857.27 |
| | 10.26.3 | Providing and fixing hand rail railing, staircase railing and sin primer. 50mm dia G.I5.17kg/m , 32r Outer total-23m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia | milar we | oved size by v orks, includin GI-3.17kg/m 30 401.625 | welding e g applyin | g primi 0.75 | @ eeel ladde ng coat c 5.17 3.17 @ | Rs er railin of appro kg kg Rs | g, balcony oves steel 116.325 285.3 194.17916 | |
| | | Providing and fixing hand rail railing, staircase railing and sin primer. 50mm dia G.I5.17kg/m , 32r Outer total-23m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi so | milar we | oved size by v orks, includin GI-3.17kg/m 30 401.625 | welding e g applyin | g primi 0.75 | @ eeel ladde ng coat c 5.17 3.17 @ | Rs er railin of appro kg kg Rs using p | g, balcony oves steel 116.325 285.3 194.17916 | |
| | | Providing and fixing hand rail railing, staircase railing and sin primer. 50mm dia G.I5.17kg/m , 32r Outer total-23m/1m c/c vertical 50mm dia Horizontal 0.25m c/c-32mm dia Say Finishing with Deluxe Multi si manufacturers specifications: | milar wa nm dia 30 3 urface p | oved size by orks, includin GI-3.17kg/m 30 401.625 vaint system fo | welding e g applyin | 0.75 o.75 | @ eeel laddo ng coat o 5.17 3.17 @ xteriors | Rs er railin of appro kg kg Rs using p m2 | g, balcony oves steel 116.325 285.3 194.17916 | |

| 24 | 100.36.1 | Filling water with 5000 litre ta (average) to the reservoir site a m using 5 HP diesel engine pu of water etc. complete. | and pun | nping the wate | er into the | e reserv | oir of he | ight n | ot less than 3 | | | | | |
|----|----------|---|--------------------------------|----------------|-------------|----------|-----------|--------|----------------|--------------|--|--|--|--|
| | | | 1 38.465 8.53 328.11 m3 | | | | | | | | | | | |
| | | Say | | 3281.06 | Kilo litre | | a | Rs | 218.94691 | 718378.93 | | | | |
| | | Total-collec | Total-collection well 5 | | | | | | | | | | | |
| 25 | 100.7.1 | Bailing out water with 5 HP er back of engine and pump, cost (Prepared based on PHED SD | t of fuel | lubricating of | | | | | | | | | | |
| | | For 5 wells (5* 3 nos*20 days* 10 hrs* 5 HP) | | 15000 | | | | | | | | | | |
| | | | | 15000 | kwh | | a | Rs | 38.57 | ₹ 578,503.88 | | | | |
| | | TOTAL FOR CO | TOTAL FOR COLLECTION WELL10,39 | | | | | | | | | | | |

ASST. ENGINEER PPD CAMP OFFICE KERALA WATER AUTHORITY **IDUKKI**

Seen

ASSISTANT EXECUTIVE ENGINEER-1 SEWERAGE CIRCLE KERALA WATER AUTHORITY KOCHI-11

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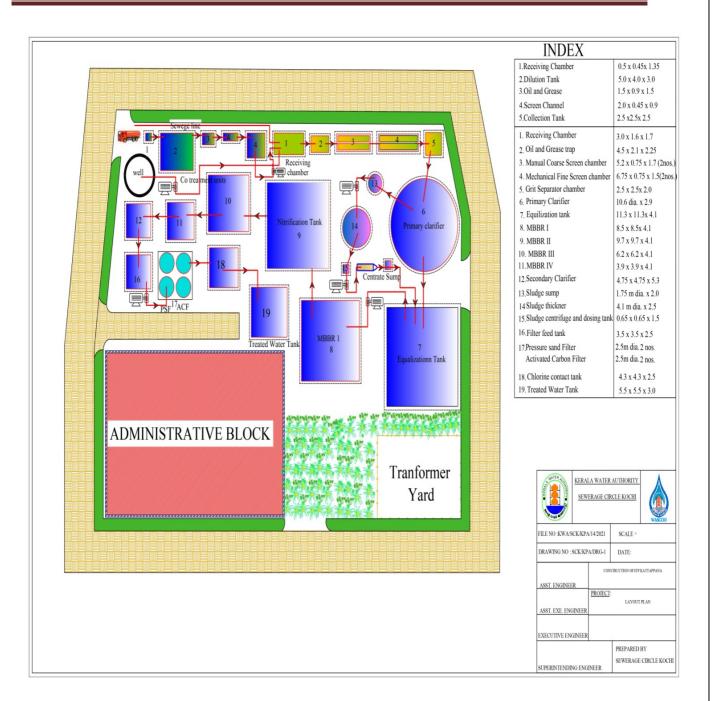
Executive Engineer Sewerage Circle Kochi - 11



Superintending Engineer Kerala Water Authority Sewerage Circle Kochi - 11 DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana

ANNEXURE - 2 LAYOUT OF STP UNITS

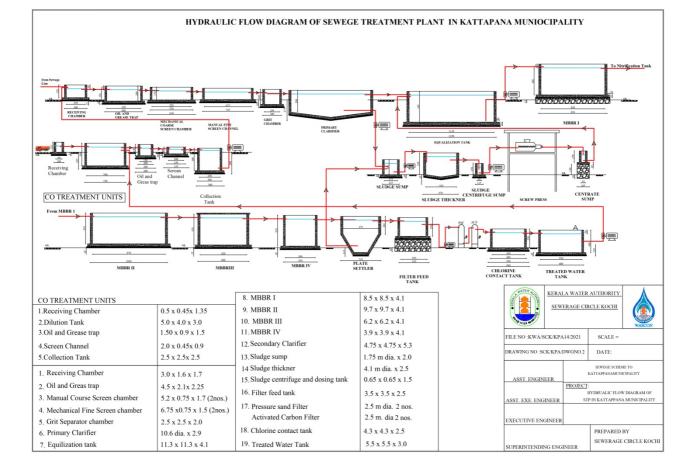
Kerala Water Authority, Sewerage Circle, Kochi



DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana

ANNEXURE – 3

PROCESS FLOW DIAGRAM



ANNEXURE – 4

DESIGN USING SWMM SOFTWARE – OUTPUTS

Kattapana Network-Well zone -1

| | [NODE |] | | | [CON Peak | DUITS] | | | |
|------------|---------------------|---------------------|-----------------|--------------|---------------|---------------|-----------|---------|--------|
| Node ID | Ground Elevation | Invert Elevation | Depth of Cut | DWF (LPS) | Flow (LPS) | Conduit ID | From Node | To Node | Length |
| J718 | 877.49 | 876.34 | 1.15 | 0.0113 | 0.0339 | 168 | J718 | J715 | 18.17 |
| J715 | 878.18 | 876.23 | 1.95 | 0.0113 | 0.0339 | 169 | J715 | J589 | 18.25 |
| J589 | 878.89 | 876.13 | 2.76 | 0.0113 | 0.0339 | 170 | J589 | J716 | 13.57 |
| J716 | 879.29 | 876.05 | 3.24 | 0.0113 | 0.0339 | 171 | J716 | J586 | 28.22 |
| J586 | 880.23 | 875.88 | 4.35 | 0.0113 | 0.0339 | 172 | J586 | J710 | 19.94 |
| J710 | 880.24 | 875.76 | 4.48 | 0.0113 | 0.0339 | 173 | J710 | J704 | 21.62 |
| J704 | 881.24 | 875.64 | 5.60 | 0.0113 | 0.0339 | 174 | J704 | J705 | 29.91 |
| J705 | 881.9 | 875.46 | 6.44 | 0.0113 | 0.0339 | 175 | J705 | J702 | 29.88 |
| J702 | 881.72 | 875.28 | 6.44 | 0.0113 | 0.0339 | 176 | J702 | J703 | 29.82 |
| J703 | 881.71 | 875.11 | 6.60 | 0.0113 | 0.0339 | 177 | J703 | J708 | 29.45 |
| J708 | 879.53 | 874.94 | 4.59 | 0.0113 | 0.0339 | 178 | J708 | J709 | 29.88 |
| J709 | 876.98 | 874.76 | 2.22 | 0.0113 | 0.0339 | 179 | J709 | J587 | 15.25 |
| J587 | 876.33 | 874.67 | 1.66 | 0.0113 | 0.0339 | 180 | J587 | J706 | 14.91 |
| J706 | 875.97 | 874.58 | 1.39 | 0.0113 | 0.0339 | 181 | J706 | J707 | 29.44 |
| J707 | 875.52 | 874.37 | 1.15 | 0.0113 | 0.0339 | 182 | J707 | J798 | 30 |
| J798 | 875.57 | 874.19 | 1.38 | 0.0113 | 0.0339 | 183 | J798 | J799 | 35.59 |
| J799 | 876.4 | 873.98 | 2.42 | 0.0113 | 0.0339 | 184 | J799 | J796 | 23.97 |
| J796 | 875.87 | 873.84 | 2.03 | 0.0113 | 0.0339 | 185 | J796 | J797 | 29.79 |
| J797 | 874.35 | 873.20 | 1.15 | 0.0113 | 0.0339 | 186 | J797 | J802 | 29.87 |
| J802 | 872.07 | 870.92 | 1.15 | 0.0113 | 0.0339 | 187 | J802 | J803 | 29.21 |
| J803 | 869.76 | 868.61 | 1.15 | 0.0113 | 0.0339 | 188 | J803 | J800 | 29.64 |
| J800 | 867.91 | 866.76 | 1.15 | 0.0113 | 0.0339 | 189 | J800 | J801 | 33.78 |
| J801 | 866.24 | 865.09 | 1.15 | 0.0113 | 0.0339 | 190 | J801 | J795 | 26.06 |
| J795 | 865.91 | 864.76 | 1.15 | 0.0113 | 0.0339 | 191 | J795 | J789 | 29.83 |
| J789 | 865.78 | 864.58 | 1.20 | 0.0113 | 0.0339 | 192 | J789 | J790 | 29.98 |
| J790 | 865.69 | 864.41 | 1.28 | 0.0113 | 0.0339 | 193 | J790 | J787 | 29.91 |
| J787 | 865.83 | 864.23 | 1.60 | 0.0113 | 0.0339 | 194 | J787 | J788 | 33.73 |
| J788 | 865.55 | 864.03 | 1.52 | 0.0113 | 0.0339 | 195 | J788 | J793 | 26.2 |
| J793 | 864.92 | 863.77 | 1.15 | 0.0113 | 0.0339 | 196 | J793 | J794 | 29.98 |
| J794 | 863.94 | 862.79 | 1.15 | 0.0113 | 0.0339 | 197 | J794 | J791 | 29.97 |
| J791 | 862.8 | 861.65 | 1.15 | 0.0113 | 0.0339 | 198 | J791 | J792 | 29.96 |
| J792 | 861.19 | 860.04 | 1.15 | 0.0113 | 0.0339 | 199 | J792 | J815 | 29.95 |
| J815 | 860 | 858.85 | 1.15 | 0.0113 | 0.0339 | 200 | J815 | J816 | 29.97 |
| J816 | 858.69 | 857.54 | 1.15 | 0.0113 | 0.0339 | 201 | J816 | J813 | 29.96 |
| J813 | 857.17 | 856.02 | 1.15 | 0.0113 | 0.0339 | 202 | J813 | J814 | 29.94 |
| J814 | 855.37 | 854.22 | 1.15 | 0.0113 | 0.0339 | 203 | J814 | J819 | 29.8 |
| J819 | 853.08 | 851.93 | 1.15 | 0.0113 | 0.0339 | 204 | J819 | J820 | 29.9 |
| J820 | 851.77 | 850.62 | 1.15 | 0.0113 | 0.0339 | 205 | J820 | J817 | 29.99 |
| J817 | 851.85 | 850.44 | 1.41 | 0.0113 | 0.0339 | 206 | J817 | J611 | 16.12 |
| J611 | 852.08 | 850.35 | 1.73 | 0.0863 | 0.2589 | 207 | J611 | J818 | 13.46 |
| J818 | 852.17 | 850.27 | 1.90 | 0.0113 | 0.0339 | 208 | J818 | J610 | 15.25 |

| | DEI | R for 1.76 M | ILD capac | city STP fo | or Sewerage | Network& | FSSM at | Kattapana | | |
|----------------|------------------|------------------|-----------|-------------|-------------|------------|----------------|----------------|----------|----|
| J610 | 852.1 | 850.18 | 1.92 | 0.0113 | 0.0339 | 209 | J610 | J812 | 22.13 | |
| J812 | 853.91 | 850.05 | 3.86 | 0.0113 | 0.0339 | 210 | J812 | J806 | 22.33 | LS |
| J806 | 855.62 | 854.47 | 1.15 | 0.0113 | 0.0339 | 211 | J806 | J609 | 15.2 | |
| J609 | 856.99 | 854.38 | 2.61 | 0.0113 | 0.0339 | 212 | J609 | J807 | 14.5 | |
| J807 | 858.17 | 854.30 | 3.87 | 0.0113 | 0.0339 | 213 | J807 | J804 | 29.62 | |
| J804 | 859.61 | 854.12 | 5.49 | 0.0113 | 0.0339 | 214 | J804 | J608 | 15.34 | |
| J608 | 860.13 | 854.03 | 6.10 | 0.0113 | 0.0339 | 215 | J608 | J805 | 16.89 | |
| J805 | 860.56 | 853.93 | 6.63 | 0.0113 | 0.0339 | 216 | J805 | J219 | 18.56 | |
| J219 | 860.8 | 853.82 | 6.98 | 0.0113 | 0.0339 | 680 | J219 | J220 | 29.54 | |
| J220 | 859.57 | 853.65 | 5.92 | 0.0113 | 0.0339 | 681 | J220 | J214 | 29.85 | |
| J214 | 856.58 | 853.47 | 3.11 | 0.0113 | 0.0339 | 682 | J214 | J208 | 29.76 | |
| J208 | 852.85 | 851.70 | 1.15 | 0.0113 | 0.0339 | 683 | J208 | J209 | 29.39 | |
| J209 | 851.02 | 849.87 | 1.15 | 0.0113 | 0.0339 | 684 | J209 | J206 | 30 | DM |
| J1000 | 870.13 | 868.98 | 1.15 | 0.0113 | 0.0339 | 130 | J1000 | J999 | 22.59 | |
| J999 | 870.2 | 868.85 | 1.35 | 0.0113 | 0.0339 | 131 | J999 | J963 | 19.41 | |
| J963 | 869.52 | 868.37 | 1.15 | 0.0113 | 0.0339 | 132 | J963 | J994 | 19.99 | |
| J994 | 868.83 | 867.68 | 1.15 | 0.0113 | 0.0339 | 133 | J994 | J993 | 20.55 | |
| J993 | 867.96 | 866.81 | 1.15 | 0.0113 | 0.0339 | 133 | J993 | J996 | 29.99 | |
| J996 | 867.04 | 865.89 | 1.15 | 0.0113 | 0.0339 | 135 | J996 | J995 | 29.97 | |
| J995 | 866.47 | 865.32 | 1.15 | 0.0113 | 0.0339 | 136 | J995 | J1001 | 18.29 | |
| J1001 | 866.44 | 865.21 | 1.13 | 0.0113 | 0.0339 | 130 | J1001 | J966 | 21.71 | |
| J966 | 866.12 | 864.97 | 1.15 | 0.0113 | 0.0339 | 137 | J966 | J1007 | 21.71 | |
| J1007 | 865.82 | 864.67 | 1.15 | 0.0113 | 0.0339 | 130 | J1007 | J1007 | 20 30 | |
| J1007 | 865.38 | 864.23 | 1.15 | 0.0113 | 0.0339 | 492 | J1007 | J801 | 29.99 | LS |
| J1000 J1040 | 896.21 | 895.06 | 1.15 | 0.0113 | 0.0339 | 504 | J1040 | J1043 | 18.62 | LS |
| J1040 J1043 | 896.39 | 895.00 894.95 | 1.13 | 0.0113 | 0.0339 | 503 | J1040 | J1045 | 20.71 | |
| J1045 J1039 | 896.59 896.59 | 894.93 894.83 | 1.76 | 0.0113 | 0.0339 | 502 | J1045 | J1039 | 18.83 | |
| J1039 J1038 | 890.39 897.1 | 894.83 894.72 | 2.38 | 0.0113 | 0.0339 | 502 | J1039 | J1038 | 29.97 | |
| J1038 J1083 | 896.77 | 894.72 894.54 | 2.38 | 0.0113 | 0.0339 | 500 | J1038 | J1085 | 29.97 | |
| J1083 J1082 | 890.77 | 894.34 894.37 | 1.31 | 0.0113 | 0.0339 | 499 | J1085 | J1082 | 29.93 | |
| J1082 J1085 | 893.08 893.07 | 894.37 891.92 | 1.15 | 0.0113 | 0.0339 | 499 498 | J1082 J1085 | J1085 J1084 | 29.84 | |
| J1085 J1084 | 893.07 | 891.92 890.76 | 1.15 | 0.0113 | 0.0339 | 497 | J1085 | J1079 | 16.4 | |
| J1084 J1079 | 891.91 | 890.70 890.54 | | 0.0113 | 0.0339 | 497 496 | J1084 J1079 | J1079 J1042 | 26.22 | |
| | | | 1.15 | 0.0113 | | 490 495 | | | | |
| J1042 | 891.36 | 890.21 | 1.15 | | 0.0339 | | J1042 | J1078 | 17.28 | |
| J1078 | 891.18 | 890.03 | 1.15 | 0.0113 | 0.0339 | 494 515 | J1078 | J1037 | 14.82 | |
| J1037 | 890.45 | 889.30 | 1.15 | 0.0113 | 0.0339 | 515 | J1037 | J1081 | 23.23 | |
| J1081 | 888.01 | 886.86 | 1.15 | 0.0113 | 0.0339 | 491 400 | J1081 | J1080 | 21.67 | |
| J1080 | 885.69 | 884.54 | 1.15 | 0.0113 | 0.0339 | 490 | J1080 | J1086 | 29.79 | |
| J1086 | 882.27 | 881.12 | 1.15 | 0.0113 | 0.0339 | 489 | J1086 | J1092 | 29.88 | |
| J1092 | 879.57 | 878.42 | 1.15 | 0.0113 | 0.0339 | 488 | J1092 | J1091 | 29.93 | |
| J1091 | 878.02 | 876.87 | 1.15 | 0.0113 | 0.0339 | 487 | J1091 | J1094 | 29.97 | |
| J1094 | 876.61 | 875.46 | 1.15 | 0.0113 | 0.0339 | 486 | J1094 | J1093 | 29.78 | |
| J1093 | 874.46 | 873.31 | 1.15 | 0.0113 | 0.0339 | 485 | J1093 | J1088 | 34.22 | |
| J1088 | 869.47 | 868.32 | 1.15 | 0.0113 | 0.0339 | 484 | J1088 | J790 | 28.25 | |
| J1030 | 907.49 | 906.34 | 1.15 | 0.0113 | 0.0339 | 519 | J1030 | J1029 | 10.97 | |
| J1029 | 905.25 | 904.10 | 1.15 | 0.0113 | 0.0339 | 518 | J1029 | J1035 | 25.06 | |
| J1035 | 899.3 | 898.15 | 1.15 | 0.0113 | 0.0339 | 517 | J1035 | J1041 | 29.56 | |

| | DE | R for 1.76 MI | LD capac | city STP fo | or Sewerage I | Network& | E FSSM at K | <i>Cattapana</i> | |
|-------|--------|---------------|----------|-------------|---------------|----------|-------------|------------------|-------|
| J1041 | 894.22 | 893.07 | 1.15 | 0.0113 | 0.0339 | 516 | J1041 | J1078 | 19.64 |
| J1031 | 882.12 | 880.97 | 1.15 | 0.0113 | 0.0339 | 483 | J1031 | J1032 | 19.68 |
| J1032 | 880.28 | 879.13 | 1.15 | 0.0113 | 0.0339 | 482 | J1032 | J1034 | 19.91 |
| J1034 | 878.41 | 877.26 | 1.15 | 0.0113 | 0.0339 | 481 | J1034 | J1033 | 29.87 |
| J1033 | 875.61 | 874.46 | 1.15 | 0.0113 | 0.0339 | 480 | J1033 | J1028 | 29.87 |
| J1028 | 872.81 | 871.66 | 1.15 | 0.0113 | 0.0339 | 479 | J1028 | J1027 | 29.87 |
| J1027 | 870.01 | 868.86 | 1.15 | 0.0113 | 0.0339 | 478 | J1027 | J788 | 29.87 |
| J1050 | 896.6 | 895.45 | 1.15 | 0.0113 | 0.0339 | 649 | J1050 | J1051 | 29.93 |
| J1051 | 898.18 | 895.27 | 2.91 | 0.0113 | 0.0339 | 648 | J1051 | J1048 | 29.98 |
| J1048 | 898.75 | 895.10 | 3.65 | 0.0113 | 0.0339 | 647 | J1048 | J935 | 8.85 |
| J935 | 898.28 | 895.05 | 3.23 | 0.0113 | 0.0339 | 646 | J935 | J936 | 5.05 |
| J936 | 898.04 | 895.02 | 3.02 | 0.0113 | 0.0339 | 645 | J936 | J844 | 4.35 |
| J844 | 897.77 | 894.99 | 2.78 | 0.0113 | 0.0339 | 644 | J844 | J1049 | 6.09 |
| J1049 | 897.37 | 894.95 | 2.42 | 0.0113 | 0.0339 | 643 | J1049 | J958 | 35.6 |
| J958 | 897.84 | 894.75 | 3.09 | 0.0113 | 0.0339 | 642 | J958 | J867 | 29.89 |
| J867 | 898.27 | 894.57 | 3.70 | 0.0113 | 0.0339 | 641 | J867 | J868 | 29.98 |
| J868 | 897.82 | 894.39 | 3.43 | 0.0113 | 0.0339 | 640 | J868 | J843 | 18.42 |
| J843 | 893.81 | 892.66 | 1.15 | 0.0113 | 0.0339 | 639 | J843 | J865 | 15.92 |
| J865 | 893.46 | 892.31 | 1.15 | 0.0113 | 0.0339 | 638 | J865 | J866 | 20.65 |
| J866 | 890.98 | 889.83 | 1.15 | 0.0113 | 0.0339 | 637 | J866 | J871 | 29.84 |
| J871 | 889.6 | 888.45 | 1.15 | 0.0113 | 0.0339 | 636 | J871 | J872 | 22.53 |
| J872 | 889.84 | 888.32 | 1.52 | 0.0113 | 0.0339 | 635 | J872 | J869 | 27.46 |
| J869 | 890.15 | 888.16 | 1.99 | 0.0113 | 0.0339 | 634 | J869 | J870 | 31.44 |
| J870 | 887.01 | 885.86 | 1.15 | 0.0113 | 0.0339 | 633 | J870 | J846 | 20.04 |
| J846 | 885.11 | 883.96 | 1.15 | 0.0113 | 0.0339 | 632 | J846 | J864 | 18.14 |
| J864 | 883.4 | 882.25 | 1.15 | 0.0113 | 0.0339 | 631 | J864 | J858 | 21.1 |
| J858 | 881.37 | 880.22 | 1.15 | 0.0113 | 0.0339 | 630 | J858 | J859 | 27.22 |
| J859 | 876.68 | 875.53 | 1.15 | 0.0113 | 0.0339 | 629 | J859 | J856 | 26.41 |
| J856 | 873.65 | 872.50 | 1.15 | 0.0113 | 0.0339 | 628 | J856 | J845 | 27.03 |
| J845 | 869.75 | 868.60 | 1.15 | 0.0113 | 0.0339 | 627 | J845 | J857 | 16.84 |
| J857 | 868.25 | 867.10 | 1.15 | 0.0113 | 0.0339 | 626 | J857 | J840 | 18.72 |
| J840 | 866.08 | 864.93 | 1.15 | 0.0113 | 0.0339 | 625 | J840 | J839 | 6.11 |
| J839 | 864.13 | 862.98 | 1.15 | 0.0113 | 0.0339 | 624 | J839 | J842 | 3.16 |
| J842 | 864.97 | 862.96 | 2.01 | 0.0113 | 0.0339 | 623 | J842 | J862 | 5.75 |
| J862 | 864.14 | 862.93 | 1.21 | 0.0113 | 0.0339 | 622 | J862 | J863 | 25.64 |
| J863 | 863.89 | 862.74 | 1.15 | 0.0113 | 0.0339 | 621 | J863 | J860 | 30 |
| J860 | 863.57 | 862.42 | 1.15 | 0.0113 | 0.0339 | 620 | J860 | J861 | 29.28 |
| J861 | 861.76 | 860.61 | 1.15 | 0.0113 | 0.0339 | 619 | J861 | J884 | 29.94 |
| J884 | 861.35 | 860.20 | 1.15 | 0.0113 | 0.0339 | 618 | J884 | J885 | 29.89 |
| J885 | 860.7 | 859.55 | 1.15 | 0.0113 | 0.0339 | 617 | J885 | J882 | 28.98 |
| J882 | 858.22 | 857.07 | 1.15 | 0.0113 | 0.0339 | 616 | J882 | J883 | 29.91 |
| J883 | 857.26 | 856.11 | 1.15 | 0.0113 | 0.0339 | 615 | J883 | J888 | 26.55 |
| J888 | 856.6 | 855.45 | 1.15 | 0.0113 | 0.0339 | 614 | J888 | J889 | 33.35 |
| J889 | 854.63 | 853.48 | 1.15 | 0.0113 | 0.0339 | 613 | J889 | J841 | 16.66 |
| J841 | 852.1 | 850.95 | 1.15 | 0.0113 | 0.0339 | 612 | J841 | J847 | 4.37 |
| J847 | 851.39 | 850.24 | 1.15 | 0.0113 | 0.0339 | 611 | J847 | J853 | 4.35 |
| J853 | 850.83 | 849.68 | 1.15 | 0.0113 | 0.0339 | 610 | J853 | J886 | 8.09 |

| | DE | R for 1.76 M | ILD capad | city STP fo | or Sewerage | Network& | FSSM at | Kattapana | | |
|--------------|------------------|------------------|-----------|-------------|-------------|------------|--------------|--------------|-------|----|
| J886 | 849.36 | 848.21 | 1.15 | 0.0113 | 0.0339 | 609 | J886 | J887 | 25.48 | |
| J887 | 846.35 | 845.20 | 1.15 | 0.0113 | 0.0339 | 608 | J887 | J881 | 29.82 | |
| J881 | 844.15 | 843.00 | 1.15 | 0.0113 | 0.0339 | 607 | J881 | J875 | 29.93 | |
| J875 | 842.59 | 841.44 | 1.15 | 0.0113 | 0.0339 | 606 | J875 | J876 | 29.99 | |
| J876 | 843.2 | 841.26 | 1.94 | 0.0113 | 0.0339 | 605 | J876 | J873 | 29.95 | |
| J873 | 843.89 | 841.09 | 2.80 | 0.0113 | 0.0339 | 604 | J873 | J874 | 29.93 | |
| J874 | 845.85 | 840.91 | 4.94 | 0.0113 | 0.0339 | 603 | J874 | J879 | 29.93 | LS |
| J879 | 847.75 | 846.60 | 1.15 | 0.0113 | 0.0339 | 602 | J879 | J880 | 29.95 | |
| J880 | 849.4 | 846.42 | 2.98 | 0.0113 | 0.0339 | 601 | J880 | J852 | 18.87 | |
| J852 | 849.83 | 846.31 | 3.52 | 0.0113 | 0.0339 | 600 | J852 | J855 | 5.96 | |
| J855 | 849.94 | 846.28 | 3.66 | 0.0113 | 0.0339 | 599 | J855 | J877 | 5.79 | |
| J877 | 849.78 | 846.24 | 3.54 | 0.0113 | 0.0339 | 598 | J877 | J854 | 16.76 | |
| J854 | 850.97 | 846.15 | 4.82 | 0.0113 | 0.0339 | 597 | J854 | J849 | 9.64 | |
| J849 | 850.52 | 846.09 | 4.43 | 0.0113 | 0.0339 | 596 | J849 | J878 | 12.2 | |
| J878 | 849.56 | 846.02 | 3.54 | 0.0113 | 0.0339 | 595 | J878 | J833 | 25.66 | |
| J833 | 846.05 | 844.90 | 1.15 | 0.0113 | 0.0339 | 594 | J833 | J848 | 11.85 | |
| J848 | 847.51 | 844.83 | 2.68 | 0.0113 | 0.0339 | 593 | J848 | J834 | 12.26 | |
| J834 | 847.99 | 844.76 | 3.23 | 0.0113 | 0.0339 | 593 592 | J834 | J851 | 14.99 | |
| J851 | 850.17 | 844.67 | 5.50 | 0.0113 | 0.0339 | 592 591 | J851 | J831 | 14.46 | |
| J831 | 851.21 | 844.58 | 6.63 | 0.0113 | 0.0339 | 590 | J831 | J832 | 23.06 | |
| J832 | 850.75 | 844.45 | 6.30 | 0.0113 | 0.0339 | 589 | J832 | J837 | 36.76 | |
| J832 J837 | 847.14 | 844.23 | 2.91 | 0.0113 | 0.0339 | 588 | J837 | J850 | 25.57 | |
| J850 | 844.9 | 843.75 | 1.15 | 0.0113 | 0.0339 | 587 | J850 | J838 | 12.03 | |
| J838 | 844.77 | 843.62 | 1.15 | 0.0113 | 0.0339 | 586 | J838 | J835 | 21.13 | |
| J835 | 845.65 | 843.50 | 2.15 | 0.0113 | 0.0339 | 585 | J835 | J836 | 41.94 | LS |
| J835 J836 | 849.69 | 848.54 | 1.15 | 0.0113 | 0.0339 | 585 | J836 | J830 | 17.35 | LS |
| J830 J830 | 851.8 | 848.44 | 3.36 | 0.0113 | 0.0339 | 583 | J830 | J827 | 17.33 | |
| J830 J827 | 851.78 | 848.36 | 3.42 | 0.0113 | 0.0339 | 585 | J827 | J827 J824 | 12.84 | |
| J827 J824 | 850.42 | 848.26 | 2.16 | 0.0113 | 0.0339 | 582 | J824 | J824 J825 | 29.97 | |
| J824 J825 | 850.42 850.92 | 848.09 | 2.10 | 0.0113 | 0.0339 | 580 | J824 J825 | J823 J822 | 29.97 | |
| J825 J822 | 850.92 850.46 | 847.91 | 2.85 | 0.0113 | 0.0339 | 579 | J823 | J822 J823 | 29.99 | |
| J822 J823 | 850.40 | 847.73 | 2.33 | 0.0113 | 0.0339 | 579 | J822 J823 | J823 J828 | 29.90 | |
| J823 J828 | 850.15 850.24 | 847.56 | 2.42 | 0.0113 | 0.0339 | 578 | J823 | J828 J829 | 29.98 | |
| J828 J829 | 851.53 | 847.38 | 4.15 | 0.0113 | 0.0339 | 576 | J828 J829 | J829 J826 | 29.68 | |
| J829 J826 | 852.79 | | | 0.0113 | 0.0339 | | J829 J826 | J610 | 29.09 | LS |
| | | 847.21 | 5.58 | | | 575 651 | J1045 | | | LS |
| J1045 | 892.52 | 891.37 887.69 | 1.15 | 0.0113 | 0.0339 | 651 652 | | J1044 | 22.33 | |
| J1044 | 888.84 | 887.69 881.48 | 1.15 | 0.0113 | 0.0339 | 652 | J1044 | J1047 | 36.48 | |
| J1047 | 882.63 | 881.48 877.22 | 1.15 | 0.0113 | 0.0339 | 653 | J1047 | J1046 | 29.68 | |
| J1046 | 878.37 | 877.22 | 1.15 | 0.0113 | 0.0339 | 654 | J1046 | J1052 | 24.6 | |
| J1052 | 875.07 | 873.92 | 1.15 | 0.0113 | 0.0339 | 655 242 | J1052 | J780 | 27.09 | |
| J780 | 873.91 | 872.76 | 1.15 | 0.0113 | 0.0339 | 242 | J780 | J779 | 31.63 | |
| J779 | 873.59 | 872.44 | 1.15 | 0.0113 | 0.0339 | 241 | J779 | J782 | 29.95 | |
| J782 | 873.02 | 871.87 | 1.15 | 0.0113 | 0.0339 | 240 | J782 | J781 | 30 | |
| J781 | 872.84 | 871.69 | 1.15 | 0.0113 | 0.0339 | 239 | J781 | J758 | 29.98 | |
| J758 | 872.56 | 871.41 | 1.15 | 0.0113 | 0.0339 | 238 | J758 | J757 | 29.95 | |
| J757 | 872.35 | 871.20 | 1.15 | 0.0113 | 0.0339 | 237 | J757 | J760 | 29.96 | |
| J760 | 872.19 | 871.02 | 1.17 | 0.0113 | 0.0339 | 236 | J760 | J759 | 29.96 | |

| | DE | R for 1.76 N | ILD capad | city STP fo | or Sewerage | Network& | E FSSM | at Kattapana | | |
|------|--------|--------------|-----------|-------------|-------------|----------|--------|--------------|-------|----|
| J759 | 872.03 | 870.85 | 1.18 | 0.0113 | 0.0339 | 235 | J759 | J754 | 29.99 | |
| J754 | 871.92 | 870.67 | 1.25 | 0.0113 | 0.0339 | 234 | J754 | J753 | 29.79 | |
| J753 | 871.88 | 870.50 | 1.38 | 0.0113 | 0.0339 | 233 | J753 | J756 | 29.78 | |
| J756 | 871.94 | 870.32 | 1.62 | 0.0113 | 0.0339 | 232 | J756 | J755 | 36.23 | |
| J755 | 872.16 | 870.11 | 2.05 | 0.0113 | 0.0339 | 231 | J755 | J761 | 23.65 | |
| J761 | 872.41 | 869.97 | 2.44 | 0.0113 | 0.0339 | 230 | J761 | J615 | 14.02 | |
| J615 | 872.78 | 869.89 | 2.89 | 0.0113 | 0.0339 | 229 | J615 | J767 | 22.97 | |
| J767 | 872.6 | 869.75 | 2.85 | 0.0113 | 0.0339 | 228 | J767 | J766 | 23.26 | |
| J766 | 872.05 | 869.61 | 2.44 | 0.0113 | 0.0339 | 227 | J766 | J769 | 29.63 | |
| J769 | 870.51 | 869.36 | 1.15 | 0.0113 | 0.0339 | 226 | J769 | J768 | 29.97 | |
| J768 | 869.25 | 868.10 | 1.15 | 0.0113 | 0.0339 | 225 | J768 | J763 | 29.95 | |
| J763 | 867.66 | 866.51 | 1.15 | 0.0113 | 0.0339 | 224 | J763 | J762 | 29.08 | |
| J762 | 865.73 | 864.58 | 1.15 | 0.0113 | 0.0339 | 223 | J762 | J765 | 29.87 | |
| J765 | 864.54 | 863.39 | 1.15 | 0.0113 | 0.0339 | 222 | J765 | J764 | 29.21 | |
| J764 | 863.51 | 862.36 | 1.15 | 0.0113 | 0.0339 | 221 | J764 | J809 | 29.93 | |
| J809 | 862.9 | 861.75 | 1.15 | 0.0113 | 0.0339 | 220 | J809 | J808 | 29.97 | |
| J808 | 862.2 | 861.05 | 1.15 | 0.0113 | 0.0339 | 219 | J808 | J811 | 15.09 | |
| J811 | 862.04 | 860.89 | 1.15 | 0.0113 | 0.0339 | 218 | J811 | J614 | 27.63 | |
| J614 | 861.36 | 860.21 | 1.15 | 0.0113 | 0.0339 | 217 | J614 | J219 | 26.67 | DM |
| J13 | 885.64 | 884.49 | 1.15 | 0.0113 | 0.0339 | 459 | J13 | J10 | 3.26 | |
| J10 | 885.53 | 884.38 | 1.15 | 0.0113 | 0.0339 | 460 | J10 | J44 | 12.21 | |
| J44 | 885.54 | 884.31 | 1.23 | 0.0113 | 0.0339 | 461 | J44 | J47 | 29.85 | |
| J47 | 883.16 | 882.01 | 1.15 | 0.0113 | 0.0339 | 462 | J47 | J46 | 29.9 | |
| J46 | 880.87 | 879.72 | 1.15 | 0.0113 | 0.0339 | 463 | J46 | J137 | 29.96 | |
| J137 | 880.16 | 879.01 | 1.15 | 0.0113 | 0.0339 | 464 | J137 | J228 | 30 | |
| J228 | 880.14 | 878.83 | 1.31 | 0.0113 | 0.0339 | 465 | J228 | J227 | 29.98 | |
| J227 | 881.06 | 878.66 | 2.40 | 0.0113 | 0.0339 | 466 | J227 | J230 | 29.99 | |
| J230 | 881.87 | 878.48 | 3.39 | 0.0113 | 0.0339 | 467 | J230 | J229 | 29.94 | |
| J229 | 882.42 | 878.30 | 4.12 | 0.0113 | 0.0339 | 468 | J229 | J224 | 29.97 | |
| J224 | 881.75 | 878.13 | 3.62 | 0.0113 | 0.0339 | 469 | J224 | J223 | 29.96 | |
| J223 | 880.54 | 877.95 | 2.59 | 0.0113 | 0.0339 | 470 | J223 | J226 | 29.81 | |
| J226 | 877.69 | 876.54 | 1.15 | 0.0113 | 0.0339 | 471 | J226 | J225 | 29.74 | |
| J225 | 873.95 | 872.80 | 1.15 | 0.8863 | 2.6589 | 472 | J225 | J231 | 29.83 | |
| J231 | 871.93 | 870.78 | 1.15 | 0.0113 | 0.0339 | 473 | J231 | J237 | 29.26 | |
| J237 | 868.95 | 867.80 | 1.15 | 0.0113 | 0.0339 | 474 | J237 | J236 | 29.76 | |
| J236 | 865.19 | 864.04 | 1.15 | 0.0113 | 0.0339 | 696 | J236 | J239 | 30.6 | |
| J239 | 862.17 | 861.02 | 1.15 | 0.0113 | 0.0339 | 695 | J239 | J238 | 29.1 | |
| J238 | 860.61 | 859.46 | 1.15 | 0.0113 | 0.0339 | 694 | J238 | J233 | 29.96 | |
| J233 | 859.29 | 858.14 | 1.15 | 0.1363 | 0.4089 | 693 | J233 | J232 | 29.89 | |
| J232 | 857.9 | 856.75 | 1.15 | 0.0113 | 0.0339 | 692 | J232 | J235 | 29.79 | |
| J235 | 856.9 | 855.75 | 1.15 | 1.3723 | 4.1169 | 691 | J235 | J234 | 30 | |
| J234 | 856.57 | 855.42 | 1.15 | 0.0113 | 0.0339 | 690 | J234 | J211 | 29.97 | |
| J211 | 855.31 | 854.16 | 1.15 | 0.0113 | 0.0339 | 689 | J211 | J210 | 29.94 | |
| J210 | 853.72 | 852.57 | 1.15 | 0.0113 | 0.0339 | 688 | J210 | J213 | 29.73 | |
| J213 | 851.74 | 850.59 | 1.15 | 0.0113 | 0.0339 | 687 | J213 | J212 | 29.1 | |
| J212 | 850.49 | 849.34 | 1.15 | 0.0113 | 0.0339 | 686 | J212 | J207 | 29.96 | |
| J207 | 850.64 | 849.16 | 1.48 | 0.0113 | 0.0339 | 1 | J207 | J206 | 29.7 | |
| | | | | | | | | | | - |

| DER for 1.76 MLD | capacity STP for Sew | erage Network& FS | SM at Kattapana |
|------------------|----------------------|-------------------|-----------------|
| | | | |

| J206 | 850.64 | 848.99 | 1.65 | 0.1053 | 0.3159 | 354 | J206 | OUTFALL 1 | 43.61 | WELL |
|------|--------|--------|------|--------|--------|-----|------|--------------|-------|------|
| J771 | 883.83 | 882.68 | 1.15 | 0.0113 | 0.0339 | 254 | J771 | J770 | 25.55 | WEEL |
| J770 | 883.1 | 881.95 | 1.15 | 0.0113 | 0.0339 | 253 | J770 | J773 | 29.53 | |
| J773 | 882.49 | 881.34 | 1.15 | 0.0113 | 0.0339 | 252 | J773 | J772 | 29.91 | |
| J772 | 881.95 | 880.80 | 1.15 | 0.0113 | 0.0339 | 251 | J772 | J778 | 29.9 | |
| J778 | 880.45 | 879.30 | 1.15 | 0.0113 | 0.0339 | 250 | J778 | J784 | 29.98 | |
| J784 | 879.27 | 878.12 | 1.15 | 0.0113 | 0.0339 | 249 | J784 | J612 | 18.64 | |
| J612 | 878.06 | 876.91 | 1.15 | 0.0113 | 0.0339 | 248 | J612 | J783 | 19.25 | |
| J783 | 877.42 | 876.27 | 1.15 | 0.0113 | 0.0339 | 247 | J783 | J786 | 21.55 | |
| J786 | 876.23 | 875.08 | 1.15 | 0.0113 | 0.0339 | 246 | J786 | J607 | 18.57 | |
| J607 | 874.97 | 873.82 | 1.15 | 0.0113 | 0.0339 | 245 | J607 | J785 | 13.08 | |
| J785 | 874.43 | 873.28 | 1.15 | 0.0113 | 0.0339 | 244 | J785 | J613 | 3.3 | |
| J613 | 874.16 | 873.01 | 1.15 | 0.0113 | 0.0339 | 656 | J613 | J60 | 29.95 | |
| J60 | 874.76 | 872.83 | 1.93 | 0.0113 | 0.0339 | 436 | J60 | J66 | 29.99 | |
| J66 | 875.51 | 872.66 | 2.85 | 0.0113 | 0.0339 | 435 | J66 | J55 | 21.89 | |
| J55 | 876.17 | 872.53 | 3.64 | 0.0113 | 0.0339 | 434 | J55 | J54 | 20 | |
| J54 | 876.07 | 872.41 | 3.66 | 0.0113 | 0.0339 | 433 | J54 | J52 | 23 | |
| J52 | 876.02 | 872.28 | 3.74 | 0.0113 | 0.0339 | 432 | J52 | J65 | 25 | |
| J65 | 875.37 | 872.13 | 3.24 | 0.0113 | 0.0339 | 431 | J65 | J68 | 29.95 | |
| J68 | 873.72 | 871.95 | 1.77 | 0.0113 | 0.0339 | 430 | J68 | J67 | 29.3 | |
| J67 | 873.15 | 871.78 | 1.37 | 0.0113 | 0.0339 | 429 | J67 | J53 | 17.8 | |
| J53 | 873.22 | 871.68 | 1.54 | 0.0113 | 0.0339 | 428 | J53 | J62 | 20.67 | |
| J62 | 871.83 | 870.68 | 1.15 | 0.0113 | 0.0339 | 427 | J62 | J61 | 29.74 | |
| J61 | 875.01 | 870.51 | 4.51 | 0.0113 | 0.0339 | 426 | J61 | J64 | 21.58 | |
| J64 | 869.48 | 868.33 | 1.15 | 0.0113 | 0.0339 | 425 | J64 | J63 | 29.54 | |
| J63 | 864.25 | 863.10 | 1.15 | 0.0113 | 0.0339 | 424 | J63 | J40 | 29.55 | |
| J40 | 859.06 | 857.91 | 1.15 | 0.0113 | 0.0339 | 423 | J40 | J39 | 29.97 | DM |
| J22 | 869.16 | 868.01 | 1.15 | 0.0113 | 0.0339 | 409 | J22 | J25 | 29.32 | |
| J25 | 863.04 | 861.89 | 1.15 | 0.0113 | 0.0339 | 410 | J25 | J24 | 29.49 | |
| J24 | 857.84 | 856.69 | 1.15 | 0.0113 | 0.0339 | 411 | J24 | J19 | 29.4 | |
| J19 | 853.06 | 851.91 | 1.15 | 0.0113 | 0.0339 | 412 | J19 | J23 | 9.84 | |
| J37 | 872.88 | 871.73 | 1.15 | 0.3973 | 1.1919 | 446 | J37 | J38 | 16.23 | |
| J38 | 873.02 | 871.63 | 1.39 | 0.0113 | 0.0339 | 445 | J38 | J35 | 29.75 | |
| J35 | 870.59 | 869.44 | 1.15 | 0.0113 | 0.0339 | 444 | J35 | J36 | 29.59 | |
| J36 | 866.85 | 865.70 | 1.15 | 0.0113 | 0.0339 | 443 | J36 | J41 | 29.54 | |
| J41 | 862.16 | 861.01 | 1.15 | 0.0113 | 0.0339 | 442 | J41 | J56 | 15.89 | |
| J56 | 859.37 | 858.22 | 1.15 | 0.0113 | 0.0339 | 441 | J56 | J59 | 7.19 | |
| J59 | 858.93 | 857.78 | 1.15 | 0.0113 | 0.0339 | 440 | J59 | J42 | 6.18 | |
| J42 | 858.74 | 857.59 | 1.15 | 0.0113 | 0.0339 | 439 | J42 | J58 | 14.86 | |
| J58 | 858.54 | 857.39 | 1.15 | 0.0113 | 0.0339 | 438 | J58 | J39 | 15.5 | |
| J39 | 858.69 | 857.30 | 1.39 | 0.0113 | 0.0339 | 422 | J39 | J28 | 23.2 | |
| J28 | 857.34 | 856.19 | 1.15 | 0.0113 | 0.0339 | 421 | J28 | J33 | 29.94 | |
| J33 | 855.78 | 854.63 | 1.15 | 0.0113 | 0.0339 | 420 | J33 | J34 | 29.87 | |
| J34 | 854.87 | 853.72 | 1.15 | 0.0113 | 0.0339 | 419 | J34 | J31 | 29.99 | |
| J31 | 854.56 | 853.41 | 1.15 | 0.0113 | 0.0339 | 418 | J31 | J32 | 29.99 | |
| J32 | 853.98 | 852.83 | 1.15 | 0.0113 | 0.0339 | 417 | J32 | J26 | 29.95 | |

| | DE | R for 1.76 M | LD capac | city STP fe | or Sewerage | Network& | & FSSM at 1 | Kattapana | | |
|------|--------|--------------|----------|-------------|-------------|----------|-------------|-----------|-------|----|
| 10 (| 0.50 5 | 0.50.05 | | 0.0110 | 0.0220 | 41.6 | 10 (| 100 | 20.05 | |
| J26 | 853.5 | 852.35 | 1.15 | 0.0113 | 0.0339 | 416 | J26 | J20 | 29.97 | |
| J20 | 853.09 | 851.94 | 1.15 | 0.0113 | 0.0339 | 415 | J20 | J21 | 29.96 | |
| J21 | 852.8 | 851.65 | 1.15 | 0.0113 | 0.0339 | 414 | J21 | J18 | 29.87 | |
| J18 | 852.62 | 851.47 | 1.15 | 0.0113 | 0.0339 | 413 | J18 | J23 | 19.99 | |
| J23 | 852.09 | 850.94 | 1.15 | 0.0113 | 0.0339 | 697 | J23 | J3 | 25.23 | |
| J3 | 851.79 | 850.64 | 1.15 | 0.0113 | 0.0339 | 698 | J3 | J27 | 16.43 | |
| J27 | 851.68 | 850.53 | 1.15 | 0.0113 | 0.0339 | 699 | J27 | J30 | 8.79 | |
| J30 | 851.46 | 850.31 | 1.15 | 0.0113 | 0.0339 | 700 | J30 | J9 | 15.49 | |
| J9 | 851.19 | 850.04 | 1.15 | 0.0113 | 0.0339 | 701 | J9 | J15 | 19.26 | |
| J15 | 851.24 | 849.93 | 1.31 | 0.0113 | 0.0339 | 702 | J15 | J14 | 29.96 | |
| J14 | 852.61 | 849.75 | 2.86 | 0.0113 | 0.0339 | 703 | J14 | J6 | 9.47 | |
| J6 | 853.48 | 849.69 | 3.79 | 0.0113 | 0.0339 | 704 | J6 | J8 | 9.06 | |
| J8 | 855.44 | 849.64 | 5.80 | 0.0113 | 0.0339 | 707 | J8 | J7 | 8.53 | |
| J7 | 855.33 | 849.59 | 5.74 | 0.0113 | 0.0339 | 706 | J7 | J17 | 4.14 | |
| J17 | 855.91 | 849.57 | 6.34 | 0.0113 | 0.0339 | 710 | J17 | J239 | 26.94 | LS |
| J930 | 877.38 | 876.23 | 1.15 | 0.0113 | 0.0339 | 477 | J930 | J925 | 33.56 | |
| J925 | 871.49 | 870.34 | 1.15 | 0.0113 | 0.0339 | 476 | J925 | J924 | 29.37 | |
| J924 | 865.57 | 864.42 | 1.15 | 0.0113 | 0.0339 | 475 | J924 | J804 | 29.47 | DN |
| | | | | 6.2269 | 18.6807 | | | | | |

Kattapana Network-Well zone -2

| | [NOE | DE] | | | | [CONE | DUITS] | | |
|---------|---------------------|---------------------|-----------------|--------------|-----------------------|---------------|-----------|---------|--------|
| Node ID | Ground Elevation | Invert Elevation | Depth of Cut | DWF (LPS) | Peak Flow (LPS) | Conduit ID | From Node | To Node | Length |
| J171 | 896.09 | 894.94 | 1.15 | 0.0113 | 0.0339 | 800 | J171 | J168 | 26.45 |
| J168 | 898.82 | 894.78 | 4.04 | 0.0113 | 0.0339 | 799 | J168 | J169 | 35.74 |
| J169 | 902.54 | 894.57 | 7.97 | 0.0113 | 0.0339 | 798 | J169 | J163 | 26.22 |
| J163 | 902.33 | 894.42 | 7.91 | 0.0113 | 0.0339 | 797 | J163 | J157 | 33.73 |
| J157 | 901.62 | 894.22 | 7.40 | 0.0113 | 0.0339 | 796 | J157 | J158 | 29.97 |
| J158 | 900.89 | 894.05 | 6.84 | 0.0113 | 0.0339 | 795 | J158 | J155 | 21.51 |
| J155 | 900.02 | 893.92 | 6.10 | 0.0113 | 0.0339 | 794 | J155 | J257 | 25.54 |
| J257 | 899.19 | 893.77 | 5.42 | 0.0113 | 0.0339 | 793 | J257 | J156 | 31.62 |
| J156 | 897.3 | 893.58 | 3.72 | 0.0113 | 0.0339 | 801 | J156 | J161 | 41.19 |
| J161 | 896.01 | 893.34 | 2.67 | 0.0113 | 0.0339 | 802 | J161 | J162 | 29.97 |
| J162 | 894.61 | 893.16 | 1.45 | 0.0113 | 0.0339 | 803 | J162 | J159 | 29.95 |
| J159 | 893.47 | 892.32 | 1.15 | 0.0113 | 0.0339 | 804 | J159 | J160 | 30 |
| J160 | 893.48 | 892.14 | 1.34 | 0.0113 | 0.0339 | 805 | J160 | J251 | 29.98 |
| J251 | 894.39 | 891.97 | 2.42 | 0.0113 | 0.0339 | 806 | J251 | J252 | 39.08 |
| J252 | 895.32 | 891.74 | 3.58 | 0.0113 | 0.0339 | 807 | J252 | J249 | 18.75 |
| J249 | 895.53 | 891.63 | 3.90 | 0.0113 | 0.0339 | 808 | J249 | J250 | 38.15 |
| J250 | 894.83 | 891.40 | 3.43 | 0.0113 | 0.0339 | 809 | J250 | J255 | 23.8 |
| J255 | 894.34 | 891.26 | 3.08 | 0.0113 | 0.0339 | 810 | J255 | J256 | 29.86 |
| J256 | 892.12 | 890.97 | 1.15 | 0.0113 | 0.0339 | 811 | J256 | J253 | 29.8 |
| J253 | 888.8 | 887.65 | 1.15 | 0.0113 | 0.0339 | 812 | J253 | J254 | 29.96 |
| J254 | 887.37 | 886.22 | 1.15 | 0.0113 | 0.0339 | 813 | J254 | J248 | 29.99 |

| | DE | R for 1.76 M | LD capac | rity STP fo | or Sewerage | Network& | E FSSM at | t Kattapana | | |
|--------------|------------------|------------------|----------|-------------|-------------|------------|--------------|--------------|----------------|-----|
| J248 | 886.8 | 885.65 | 1.15 | 0.0113 | 0.0339 | 814 | J248 | J242 | 29.85 | |
| J242 | 887 | 885.47 | 1.53 | 0.0113 | 0.0339 | 815 | J242 | J243 | 30 | |
| J243 | 886.47 | 885.30 | 1.17 | 0.0113 | 0.0339 | 816 | J243 | J240 | 29.98 | |
| J240 | 887.11 | 885.12 | 1.99 | 0.0113 | 0.0339 | 817 | J240 | J241 | 25.97 | |
| J241 | 888.28 | 884.97 | 3.31 | 0.0113 | 0.0339 | 818 | J241 | J246 | 33.87 | |
| J246 | 889.37 | 884.77 | 4.60 | 0.0113 | 0.0339 | 819 | J246 | J16 | 19.98 | |
| J16 | 890.14 | 884.65 | 5.49 | 0.0113 | 0.0339 | 820 | J16 | J247 | 21.75 | |
| J247 | 889.86 | 884.52 | 5.34 | 0.0113 | 0.0339 | 821 | J247 | J260 | 13.11 | |
| J260 | 889.67 | 884.45 | 5.22 | 0.0113 | 0.0339 | 822 | J260 | J244 | 9.95 | |
| J244 | 889.13 | 884.39 | 4.74 | 0.0113 | 0.0339 | 823 | J244 | J245 | 24.64 | |
| J245 | 886.84 | 884.24 | 2.60 | 0.0113 | 0.0339 | 824 | J245 | J268 | 29.95 | |
| J268 | 885.36 | 884.07 | 1.29 | 0.0113 | 0.0339 | 825 | J268 | J269 | 29.64 | |
| J269 | 883.76 | 882.61 | 1.15 | 0.0113 | 0.0339 | 826 | J269 | J266 | 29.9 | |
| J269 J266 | 881.55 | 880.40 | 1.15 | 0.0113 | 0.0339 | 827 | J266 | J267 | 29.98 | |
| J260 J267 | 880.69 | 879.54 | 1.15 | 0.0113 | 0.0339 | 828 | J267 | J272 | 29.98 | |
| J272 | 880.05 | 878.91 | 1.15 | 0.0113 | 0.0339 | 829 | J272 | J272 | 29.99 | |
| J272 J273 | 878.73 | 878.91 | 1.15 | 0.0113 | 0.0339 | 829 | J272 J273 | J275 | 29.91 29.79 | |
| J273 J270 | 878.73 | 877.38 874.76 | 1.15 | 0.0226 | 0.0539 | 830 | J275 J270 | J270 J271 | 29.79 | |
| J270 J271 | 873.89 | 874.70 | 1.15 | 0.0220 | 0.0339 | 831 | J270 J271 | J265 | 29.92 29.91 | |
| J271 J265 | 873.89 871.62 | 872.74 870.47 | | 0.0113 | 0.0339 | 832 | J271 J265 | J263 J259 | 29.91 29.83 | |
| J265 J259 | 868.5 | 870.47 867.35 | 1.15 | 0.0113 | 0.0339 | 833 834 | J265 J259 | J239 J448 | 29.83 29.61 | DM |
| | | | 1.15 | | | | | | 29.01 | DIV |
| J341 | 881.17 | 880.02 | 1.15 | 0.0113 | 0.0339 | 1017 | J341 | J336 | | |
| J336 | 880.8 | 879.65 | 1.15 | 0.0113 | 0.0339 | 1018 | J336 | J335 | 30 | |
| J335 | 881.03 | 879.47 | 1.56 | 0.0113 | 0.0339 | 1019 | J335 | J338 | 29.94 | |
| J338 | 881.88 | 879.30 | 2.58 | 0.0113 | 0.0339 | 1020 | J338 | J337 | 29.98 | |
| J337 | 882.5 | 879.12 | 3.38 | 0.0113 | 0.0339 | 1021 | J337 | J314 | 29.99 | |
| J314 | 882.71 | 878.94 | 3.77 | 0.0113 | 0.0339 | 1022 | J314 | J313 | 29.98 | |
| J313 | 882 | 878.77 | 3.23 | 0.0113 | 0.0339 | 1023 | J313 | J316 | 29.99 | |
| J316 | 881.1 | 878.59 | 2.51 | 0.0113 | 0.0339 | 1024 | J316 | J315 | 29.94 | |
| J315 | 879.91 | 878.42 | 1.49 | 0.0113 | 0.0339 | 1025 | J315 | J310 | 29.94 | |
| J310 | 878.12 | 876.97 | 1.15 | 0.0113 | 0.0339 | 1026 | J310 | J309 | 29.95 | |
| J309 | 876.44 | 875.29 | 1.15 | 0.0113 | 0.0339 | 906 | J309 | J317 | 18.51 | |
| J317 | 875.28 | 874.13 | 1.15 | 0.0113 | 0.0339 | 905 | J317 | J311 | 19.21 | |
| J311 | 873.98 | 872.83 | 1.15 | 0.0113 | 0.0339 | 904 | J311 | J312 | 29.93 | |
| J312 | 872.32 | 871.17 | 1.15 | 0.0113 | 0.0339 | 903 | J312 | J416 | 29.82 | |
| J416 | 870.89 | 869.74 | 1.15 | 0.0113 | 0.0339 | 900 | J416 | J421 | 8.92 | |
| J421 | 871.55 | 869.69 | 1.86 | 0.0113 | 0.0339 | 899 | J421 | J417 | 7.06 | |
| J417 | 872.91 | 869.65 | 3.26 | 0.0113 | 0.0339 | 898 | J417 | J424 | 20.91 | |
| J424 | 873.74 | 869.52 | 4.22 | 0.0113 | 0.0339 | 897 | J424 | J423 | 29.81 | |
| J423 | 875.22 | 869.35 | 5.87 | 0.0113 | 0.0339 | 896 | J423 | J419 | 20.56 | LS |
| J419 | 877.17 | 876.02 | 1.15 | 0.0113 | 0.0339 | 895 | J419 | J468 | 10.38 | |
| J468 | 878.04 | 875.96 | 2.08 | 0.0113 | 0.0339 | 894 | J468 | J418 | 11.64 | |
| J418 | 878.59 | 875.89 | 2.70 | 0.0113 | 0.0339 | 893 | J418 | J467 | 17.18 | |
| J467 | 878.41 | 875.79 | 2.62 | 0.0113 | 0.0339 | 892 | J467 | J470 | 29.91 | |
| J470 | 876.45 | 875.30 | 1.15 | 0.0113 | 0.0339 | 891 | J470 | J469 | 29.83 | |
| J469 | 873.62 | 872.47 | 1.15 | 0.0113 | 0.0339 | 890 | J469 | J464 | 29.89 | |
| J464 | 871.15 | 870.00 | 1.15 | 0.0113 | 0.0339 | 889 | J464 | J463 | 29.96 | |

| | DE | R for 1.76 M | LD capad | city STP fo | or Sewerage | Network& | E FSSM at | Kattapana | | _ |
|--------------|------------------|------------------|----------|-------------|-------------|------------|--------------|--------------|--------------|------|
| J463 | 869.7 | 868.55 | 1.15 | 0.0113 | 0.0339 | 888 | J463 | J413 | 21.07 | |
| J413 | 868.21 | 867.06 | 1.15 | 0.0113 | 0.0339 | 887 | J413 | J466 | 8.9 | |
| J466 | 868.67 | 867.01 | 1.66 | 0.0113 | 0.0339 | 886 | J466 | J465 | 29.94 | |
| J465 | 867.47 | 866.32 | 1.15 | 0.0113 | 0.0339 | 885 | J465 | J471 | 29.95 | |
| J471 | 865.95 | 864.80 | 1.15 | 0.0113 | 0.0339 | 884 | J471 | J477 | 29.87 | |
| J477 | 863.28 | 862.13 | 1.15 | 0.0113 | 0.0339 | 883 | J477 | J412 | 22.09 | |
| J412 | 861.75 | 859.97 | 1.78 | 0.0113 | 0.0339 | 882 | J412 | J476 | 7.82 | |
| J476 | 861.42 | 859.93 | 1.49 | 0.0113 | 0.0339 | 881 | J476 | J479 | 29.98 | |
| J479 | 860.5 | 859.35 | 1.15 | 0.0113 | 0.0339 | 880 | J479 | J478 | 29.97 | |
| J478 | 860.07 | 858.92 | 1.15 | 0.0113 | 0.0339 | 879 | J478 | J415 | 23.82 | |
| J415 | 859.9 | 858.75 | 1.15 | 0.0113 | 0.0339 | 878 | J415 | J414 | 3.91 | |
| J414 | 859.84 | 858.69 | 1.15 | 0.0113 | 0.0339 | 877 | J414 | J473 | 5.87 | |
| J473 | 859.84 | 858.66 | 1.18 | 0.0113 | 0.0339 | 876 | J473 | J472 | 26.27 | |
| J472 | 859.99 | 858.50 | 1.49 | 0.0113 | 0.0339 | 875 | J472 | J475 | 20.86 | |
| J475 | 860.11 | 858.38 | 1.73 | 0.0113 | 0.0339 | 874 | J475 | J420 | 25.19 | |
| J420 | 859.82 | 858.23 | 1.59 | 0.0113 | 0.0339 | 873 | J420 | J474 | 13.77 | |
| J474 | 859.73 | 858.15 | 1.58 | 0.0113 | 0.0339 | 872 | J474 | J451 | 30 | |
| J451 | 860.07 | 857.97 | 2.10 | 0.0113 | 0.0339 | 871 | J451 | J450 | 29.91 | |
| J450 | 861.39 | 857.80 | 3.59 | 0.0113 | 0.0339 | 870 | J450 | J453 | 29.81 | LS |
| J453 | 864.09 | 862.94 | 1.15 | 0.0113 | 0.0339 | 869 | J453 | J452 | 29.92 | 15 |
| J452 | 865.56 | 862.76 | 2.80 | 0.0113 | 0.0339 | 868 | J452 | J447 | 27.3 | |
| J447 | 865.83 | 862.60 | 3.23 | 0.0113 | 0.0339 | 867 | J447 | J426 | 15.43 | |
| J426 | 865.59 | 862.51 | 3.08 | 0.0113 | 0.0339 | 866 | J426 | J446 | 16.86 | |
| J446 | 865.72 | 862.41 | 3.31 | 0.0113 | 0.0339 | 865 | J446 | J449 | 29.99 | |
| J449 | 866.29 | 862.24 | 4.05 | 0.0113 | 0.0339 | 864 | J449 | J425 | 23.02 | |
| J425 | 866.31 | 862.10 | 4.21 | 0.0113 | 0.0339 | 863 | J425 | J448 | 14.98 | |
| J448 | 864 | 862.01 | 1.99 | 0.0113 | 0.0339 | 835 | J448 | J454 | 23.64 | |
| J454 | 863.1 | 861.87 | 1.23 | 0.0113 | 0.0339 | 836 | J454 | J460 | 31.24 | |
| J460 | 860.64 | 859.49 | 1.15 | 0.0113 | 0.0339 | 837 | J460 | J459 | 26.61 | |
| J459 | 859.32 | 858.17 | 1.15 | 0.1113 | 0.3339 | 838 | J459 | J462 | 29.92 | |
| J462 | 858.75 | 857.60 | 1.15 | 0.0113 | 0.0339 | 437 | J462 | OUTFALL | 30.09 | WE |
| J440 | 871.34 | 870.19 | 1.15 | 0.0113 | 0.0339 | 902 | J440 | J422 | 28.37 | 11 L |
| J422 | 871.06 | 869.91 | 1.15 | 0.0113 | 0.0339 | 902 901 | J422 | J416 | 20.57 | |
| J487 | 884.95 | 883.80 | 1.15 | 0.0113 | 0.0339 | 1109 | J487 | J484 | 22.30 | |
| J484 | 885.55 | 883.63 | 1.13 | 0.0113 | 0.0339 | 1109 | J484 | J485 | 29.85 | |
| J485 | 882.66 | 881.51 | 1.12 | 0.0113 | 0.0339 | 1103 | J485 | J508 | 29.91 | |
| J508 | 880.86 | 879.71 | 1.15 | 0.0113 | 0.0339 | 1107 | J508 | J500 | 15.42 | |
| J500 | 879.38 | 878.23 | 1.15 | 0.0113 | 0.0339 | 1100 | J500 | J500 J509 | 14.25 | |
| J509 | 879.38 879.04 | 878.23 | 1.15 | 0.0113 | 0.0339 | 1103 | J509 | J509 J506 | 29.9 | |
| J509 J506 | 879.04 876.96 | 877.89 | 1.15 | 0.0113 | 0.0339 | 1104 | J509 J506 | J508 J507 | 29.9 | |
| J506 J507 | 876.96 871.99 | 873.81 870.84 | 1.15 | 0.0113 | 0.0339 | 1103 | J506 J507 | J307 J497 | 4.23 | |
| J307 J497 | 871.99 871.58 | 870.84 870.43 | 1.15 | 0.0113 | 0.0339 | 1102 | J307 J497 | J497 J501 | 4.23 | |
| J497 J501 | 871.38 871.34 | 870.43 870.19 | 1.15 | 0.0113 | | 1101 | J497 J501 | | 4.37 9.59 | |
| | | | | 0.0113 | 0.0339 | | | J498 | | |
| J498 1503 | 871.1 870.70 | 869.95 860.64 | 1.15 | | 0.0339 | 1099 | J498 1503 | J503 | 2.75 | |
| J503 1504 | 870.79 870.36 | 869.64 860.21 | 1.15 | 0.0113 | 0.0339 | 1098 | J503 | J504 | 2.95 | |
| J504 J512 | 870.36 868 54 | 869.21 867.20 | 1.15 | 0.0113 | 0.0339 | 1097 | J504 | J512 | 10.41 | |
| JJ12 | 868.54 | 867.39 | 1.15 | 0.0113 | 0.0339 | 1096 | J512 | J513 | 29.75 | |

| | DE | CR for 1.76 M | LD capac | city STP fo | or Sewerage | Network& | E FSSM at | Kattapana | | |
|------------|------------------|------------------|--------------|-------------|-------------|----------|--------------|--------------|----------------|---|
| J513 | 864.67 | 863.52 | 1.15 | 0.0113 | 0.0339 | 1095 | J513 | J510 | 29.92 | |
| J510 | 863.52 | 862.37 | 1.15 | 0.0113 | 0.0339 | 1094 | J510 | J511 | 29.92 | |
| J511 | 865 | 862.19 | 2.81 | 0.0113 | 0.0339 | 1093 | J511 | J515 | 24.17 | |
| J546 | 894.86 | 893.71 | 1.15 | 0.0113 | 0.0339 | 1046 | J546 | J535 | 15.54 | |
| 1535 | 892.01 | 890.86 | 1.15 | 0.0113 | 0.0339 | 1047 | J535 | J536 | 5.82 | |
| 1536 | 890.96 | 889.81 | 1.15 | 0.0113 | 0.0339 | 1048 | J536 | J541 | 8.14 | |
| 541 | 889.61 | 888.46 | 1.15 | 0.0113 | 0.0339 | 1049 | J541 | J540 | 29.53 | |
| 540 | 884.61 | 883.46 | 1.15 | 0.0113 | 0.0339 | 1050 | J540 | J538 | 13.1 | |
| 538 | 881.93 | 880.78 | 1.15 | 0.0113 | 0.0339 | 1051 | J538 | J543 | 16.01 | |
| 543 | 879.06 | 877.91 | 1.15 | 0.0113 | 0.0339 | 1052 | J543 | J542 | 29.71 | |
| 542 | 874.95 | 873.80 | 1.15 | 0.0113 | 0.0339 | 1053 | J542 | J537 | 15.96 | |
| 537 | 872.81 | 871.66 | 1.15 | 0.0113 | 0.0339 | 1054 | J537 | J519 | 13.75 | |
| 519 | 871.71 | 870.56 | 1.15 | 0.0113 | 0.0339 | 1055 | J519 | J531 | 9.34 | |
| 531 | 871.52 | 870.37 | 1.15 | 0.0113 | 0.0339 | 1056 | J531 | J532 | 9.68 | |
| 532 | 871.27 | 870.12 | 1.15 | 0.0113 | 0.0339 | 1057 | J532 | J518 | 10.8 | |
| 518 | 870.81 | 869.66 | 1.15 | 0.0113 | 0.0339 | 1058 | J518 | J521 | 29.89 | |
| 521 | 868.34 | 867.19 | 1.15 | 0.0113 | 0.0339 | 1059 | J521 | J534 | 23.01 | |
| 534 | 867.08 | 865.93 | 1.15 | 0.0113 | 0.0339 | 1060 | J534 | J533 | 6.17 | |
| 533 | 866.88 | 865.73 | 1.15 | 0.0113 | 0.0339 | 1061 | J533 | J539 | 3.69 | |
| 539 | 866.89 | 865.71 | 1.18 | 0.0113 | 0.0339 | 1062 | J539 | J520 | 10.69 | |
| 520 | 866.96 | 865.65 | 1.31 | 0.0113 | 0.0339 | 1063 | J520 | J515 | 14.09 | |
| 515 | 867.18 | 865.56 | 1.62 | 0.0113 | 0.0339 | 1064 | J515 | J545 | 12.17 | |
| 545 | 867.61 | 865.49 | 2.12 | 0.0113 | 0.0339 | 1065 | J545 | J514 | 16.38 | |
| 514 | 868.92 | 865.39 | 3.53 | 0.0113 | 0.0339 | 1066 | J514 | J517 | 32.79 |] |
| 517 | 871.93 | 870.78 | 1.15 | 0.0113 | 0.0339 | 1067 | J517 | J544 | 20.2 | |
| 544 | 873.69 | 870.66 | 3.03 | 0.0113 | 0.0339 | 1068 | J544 | J516 | 10.42 | |
| 516 | 873.85 | 870.60 | 3.25 | 0.0113 | 0.0339 | 1069 | J516 | J522 | 29.83 | |
| 522 | 876.93 | 870.42 | 6.51 | 0.0113 | 0.0339 | 1070 | J522 | J528 | 29.97 | |
| 528 | 878.13 | 870.25 | 7.88 | 0.0113 | 0.0339 | 1071 | J528 | J527 | 24.58 | |
| 527 | 877.83 | 870.10 | 7.73 | 0.0113 | 0.0339 | 1072 | J527 | J547 | 19.11 | |
| 547 | 877.96 | 869.99 | 7.97 | 0.0113 | 0.0339 | 1073 | J547 | J530 | 16.01 | |
| 530 | 877.95 | 869.90 | 8.05 | 0.0113 | 0.0339 | 1074 | J530 | J529 | 29.98 | |
| 529 | 876.99 | 869.72 | 7.27 | 0.0113 | 0.0339 | 1075 | J529 | J524 | 29.92 | |
| 524 | 875.4 | 869.54 | 5.86 | 0.0113 | 0.0339 | 1076 | J524 | J523 | 29.92 | |
| 523 | 873.31 | 869.37 | 3.94 | 0.0113 | 0.0339 | 1077 | J523 | J526 | 29.87 | |
| 526 | 870.56 | 869.19 | 1.37 | 0.0113 | 0.0339 | 1078 | J526 | J525 | 29.8 | |
| 525 | 867.46 | 866.31 | 1.15 | 0.0113 | 0.0339 | 1079 | J525 | J434 | 29.68 | |
| 434 | 863.67 | 862.52 | 1.15 | 0.0113 | 0.0339 | 1080 | J434 | J475 | 29.65 |] |
| 491 | 875.57 | 802.32 874.42 | 1.15 | 0.0113 | 0.0339 | 1000 | J491 | J492 | 29.03 | 1 |
| 492 | 870.08 | 868.93 | 1.15 | 0.0113 | 0.0339 | 1091 | J491 J492 | J489 | 29.49 | |
| 489 | 865.01 | 863.86 | 1.15 | 0.0113 | 0.0339 | 1090 | J492 J489 | J489 J490 | 29.30 29.83 | |
| 490 | 862.43 | 861.28 | 1.15 | 0.0113 | 0.0339 | 1089 | J489 J490 | J490 J483 | 14.64 | |
| 490 | 862.43 862.28 | 861.13 | 1.15 | 0.0113 | 0.0339 | 1088 | J490 J483 | J483 J482 | 6.63 | |
| 485 | 862.28 | 861.05 | 1.15 | 0.0113 | 0.0339 | 1087 | J485 J482 | J482 J495 | 8.43 | |
| 482 495 | 862.2 862.04 | 861.05 | | 0.0113 | 0.0339 | 1086 | J482 J495 | J495 J496 | 8.43 29.98 | |
| 495 496 | 862.04 861.89 | 860.89 860.71 | 1.15 1.18 | 0.0113 | 0.0339 | 1085 | J495 J496 | J496 J493 | 29.98 | |
| 496 493 | 861.89 861.78 | 860.71 860.54 | 1.18 | 0.0113 | | 1084 | J496 J493 | J493 J494 | 30 29.99 | |
| 773 | 001./0 | 000.34 | 1.24 | 0.0113 | 0.0339 | 1000 | リサブン | J474 | 29.99 | |

| | DE | CR for 1.76 M | LD capac | eity STP fo | r Sewerage | Network& | & FSSM at I | Kattapana | | |
|------|--------|---------------|----------|-------------|------------|----------|-------------|-----------|-------|---|
| J494 | 861.72 | 860.36 | 1.36 | 0.0113 | 0.0339 | 1082 | J494 | J488 | 30 | |
| J488 | 861.3 | 860.15 | 1.15 | 0.0113 | 0.0339 | 1081 | J488 | J412 | 29.97 | |
| J486 | 880.25 | 879.10 | 1.15 | 0.0113 | 0.0339 | 1111 | J486 | J499 | 12.03 | |
| J499 | 878.06 | 876.91 | 1.15 | 0.0113 | 0.0339 | 1112 | J499 | J505 | 9.45 | |
| J505 | 876.15 | 875.00 | 1.15 | 0.0113 | 0.0339 | 1113 | J505 | J481 | 8.03 | |
| J481 | 875.61 | 874.46 | 1.15 | 0.0113 | 0.0339 | 1114 | J481 | J480 | 29.78 | |
| J480 | 872.04 | 870.89 | 1.15 | 0.0113 | 0.0339 | 1115 | J480 | J413 | 29.75 | |
| J433 | 875.55 | 874.40 | 1.15 | 0.0113 | 0.0339 | 862 | J433 | J436 | 7.44 | |
| J436 | 875.59 | 874.36 | 1.23 | 0.0113 | 0.0339 | 861 | J436 | J437 | 14.04 | |
| J437 | 874.6 | 873.45 | 1.15 | 0.0113 | 0.0339 | 860 | J437 | J435 | 23.76 | |
| J435 | 872.72 | 871.57 | 1.15 | 0.0113 | 0.0339 | 859 | J435 | J443 | 10.69 | |
| J443 | 870.15 | 869.00 | 1.15 | 0.0113 | 0.0339 | 858 | J443 | J430 | 13.49 | |
| J430 | 869.1 | 867.95 | 1.15 | 0.0113 | 0.0339 | 857 | J430 | J442 | 20.09 | |
| J442 | 868.55 | 867.40 | 1.15 | 0.0113 | 0.0339 | 856 | J442 | J445 | 29.96 | |
| J445 | 867.25 | 866.10 | 1.15 | 0.0113 | 0.0339 | 855 | J445 | J444 | 18.87 | |
| J444 | 865.28 | 864.13 | 1.15 | 0.0113 | 0.0339 | 854 | J444 | J429 | 19.83 | |
| J429 | 862.67 | 861.52 | 1.15 | 0.0113 | 0.0339 | 853 | J429 | J439 | 20.78 | |
| J439 | 860.25 | 859.10 | 1.15 | 0.0113 | 0.0339 | 852 | J439 | J431 | 8.43 | |
| J431 | 859.23 | 858.08 | 1.15 | 0.0113 | 0.0339 | 851 | J431 | J432 | 5.46 | |
| J432 | 859.23 | 858.05 | 1.18 | 0.0113 | 0.0339 | 850 | J432 | J438 | 16.04 | |
| J438 | 858.78 | 857.63 | 1.15 | 0.0113 | 0.0339 | 849 | J438 | J441 | 29.98 | |
| J441 | 859.71 | 857.45 | 2.26 | 0.0113 | 0.0339 | 848 | J441 | J460 | 29.98 | Ι |
| J427 | 871.16 | 870.01 | 1.15 | 0.0113 | 0.0339 | 847 | J427 | J90 | 29.97 | |
| J90 | 870.08 | 868.93 | 1.15 | 0.0113 | 0.0339 | 846 | J90 | J91 | 25.14 | |
| J91 | 868.28 | 867.13 | 1.15 | 0.0113 | 0.0339 | 845 | J91 | J428 | 9.9 | |
| J428 | 867.38 | 866.23 | 1.15 | 0.0113 | 0.0339 | 844 | J428 | J274 | 24.66 | |
| J274 | 864.85 | 863.70 | 1.15 | 0.0113 | 0.0339 | 843 | J274 | J457 | 29.82 | |
| J457 | 861.64 | 860.49 | 1.15 | 0.0113 | 0.0339 | 842 | J457 | J458 | 29.78 | |
| J458 | 858.98 | 857.83 | 1.15 | 0.0113 | 0.0339 | 140 | J458 | J462 | 35.49 | _ |
| | | | | 2.2696 | 6.8088 | | | | | |

Kattapana Network-Well zone -3

| | [NODE] | | | | D 1 | | [C | CONDUITS] | |
|------------|---------------------|---------------------|-----------------|--------------|-----------------------|---------------|--------------|-----------|--------|
| Node ID | Ground Elevation | Invert Elevation | Depth of Cut | DWF (LPS) | Peak Flow (LPS) | Conduit ID | From Node | To Node | Length |
| J11 | 887.11 | 885.96 | 1.15 | 0.0113 | 0.0339 | 456 | J11 | J12 | 18.82 |
| J12 | 885.14 | 883.99 | 1.15 | 0.0113 | 0.0339 | 455 | J12 | J45 | 12.05 |
| J45 | 883.38 | 882.23 | 1.15 | 0.0113 | 0.0339 | 454 | J45 | J50 | 29.7 |
| J50 | 879.15 | 878.00 | 1.15 | 0.0113 | 0.0339 | 453 | J50 | J51 | 29.73 |
| J51 | 875.18 | 874.03 | 1.15 | 0.0113 | 0.0339 | 452 | J51 | J48 | 29.88 |
| J48 | 872.81 | 871.66 | 1.15 | 0.0113 | 0.0339 | 451 | J48 | J49 | 29.96 |
| J49 | 872.44 | 871.29 | 1.15 | 0.0113 | 0.0339 | 450 | J49 | J43 | 30 |
| J43 | 872.43 | 871.11 | 1.32 | 0.0113 | 0.0339 | 449 | J43 | J57 | 26.32 |
| J57 | 872.66 | 870.96 | 1.70 | 0.0113 | 0.0339 | 448 | J57 | J79 | 6.17 |
| J79 | 872.64 | 870.92 | 1.72 | 0.0113 | 0.0339 | 778 | J79 | J78 | 7.3 |

| | | | ILD cup | ucity STF Jo | r Sewerage | Network | x FSSM | at Kattapana | | |
|--------------|------------------|------------------|---------|--------------|------------|---------|--------------|--------------|----------------|-------|
| J78 | 871.71 | 870.56 | 1.15 | 0.0113 | 0.0339 | 777 | J78 | J104 | 16.32 | |
| J104 | 869.55 | 870.50 868.40 | 1.15 | 0.0113 | 0.0339 | 776 | J104 | J104 J109 | 35.27 | |
| J104 J109 | 864.87 | 863.72 | 1.15 | 0.0113 | 0.0339 | 775 | J104 J109 | J84 | 16.88 | |
| J84 | 864.38 | 863.23 | 1.15 | 0.0113 | 0.0339 | 774 | J84 | J110 | 5.62 | |
| J84 J110 | 864.06 | 863.23 862.91 | 1.15 | 0.0113 | 0.0339 | 773 | J84 J110 | J85 | 11.07 | |
| J85 | 863.97 | 862.91 | 1.15 | 0.0113 | 0.0339 | 772 | J85 | J107 | 33.09 | DM |
| J85 J81 | 880.25 | 802.82 879.10 | 1.15 | 0.0113 | 0.0339 | 712 | J85 J81 | J80 | 19.39 | DIVI |
| J81 J80 | 878.02 | 879.10 876.87 | 1.15 | 0.0113 | 0.0339 | 712 | J81 J80 | J125 | 29.84 | |
| J80 J125 | 878.02 875.08 | 873.93 | 1.15 | 0.0113 | 0.0339 | 713 | J80 J125 | J125 J77 | 29.84 22.95 | |
| | | | | | | | | | | |
| J77 | 873.5 | 872.35 871.78 | 1.15 | 0.0113 | 0.0339 | 715 | J77 | J124 | 9.51 | |
| J124 | 872.93 | | 1.15 | 0.0113 | 0.0339 | 716 | J124 | J71 | 13.45 | |
| J71 | 872.28 | 871.13 | 1.15 | 0.0113 | 0.0339 | 717 | J71 | J127 | 19.84 | |
| J127 | 870.5 | 869.35 | 1.15 | 0.0113 | 0.0339 | 718 | J127 | J126 | 29.93 | |
| J126 | 869 | 867.85 | 1.15 | 0.0113 | 0.0339 | 719 | J126 | J121 | 29.99 | |
| J121 | 868.36 | 867.21 | 1.15 | 0.0113 | 0.0339 | 720 | J121 | J120 | 29.99 | |
| J120 | 867.74 | 866.59 | 1.15 | 0.0113 | 0.0339 | 721 | J120 | J123 | 29.95 | |
| J123 | 867.19 | 866.04 | 1.15 | 0.0113 | 0.0339 | 722 | J123 | J122 | 29.99 | |
| J122 | 866.55 | 865.40 | 1.15 | 0.0113 | 0.0339 | 723 | J122 | J128 | 29.99 | |
| J128 | 866.08 | 864.93 | 1.15 | 0.0113 | 0.0339 | 724 | J128 | J134 | 29.99 | |
| J134 | 865.63 | 864.48 | 1.15 | 0.0113 | 0.0339 | 725 | J134 | J133 | 29.99 | |
| J133 | 865.18 | 864.03 | 1.15 | 0.0113 | 0.0339 | 738 | J133 | J136 | 23.22 | |
| J136 | 864.85 | 863.70 | 1.15 | 0.0113 | 0.0339 | 739 | J136 | J135 | 34.54 | |
| J135 | 864.46 | 863.31 | 1.15 | 0.0213 | 0.0639 | 740 | J135 | J130 | 32.15 | |
| J130 | 863.81 | 862.66 | 1.15 | 0.0113 | 0.0339 | 741 | J130 | J129 | 30 | |
| J129 | 863.46 | 862.31 | 1.15 | 0.0113 | 0.0339 | 742 | J129 | J132 | 29.99 | |
| J132 | 863.12 | 861.97 | 1.15 | 0.0113 | 0.0339 | 743 | J132 | J131 | 20.43 | |
| J131 | 862.87 | 861.72 | 1.15 | 0.0113 | 0.0339 | 744 | J131 | J83 | 28.31 | |
| J83 | 862.77 | 861.55 | 1.22 | 0.0113 | 0.0339 | 745 | J83 | J108 | 17.61 | |
| J108 | 862.76 | 861.45 | 1.31 | 0.0113 | 0.0339 | 746 | J108 | J82 | 21.42 | |
| J82 | 863.05 | 861.32 | 1.73 | 0.0113 | 0.0339 | 747 | J82 | J107 | 19.94 | |
| J107 | 863.3 | 861.21 | 2.09 | 0.0113 | 0.0339 | 748 | J107 | J114 | 30 | |
| J114 | 862.85 | 861.03 | 1.82 | 0.0113 | 0.0339 | 749 | J114 | J115 | 30 | |
| J115 | 862.4 | 860.85 | 1.55 | 0.0113 | 0.0339 | 408 | J115 | OUTFALL | 35.73 | WELL3 |
| J551 | 900.82 | 899.67 | 1.15 | 0.0133 | 0.0399 | 295 | J551 | J550 | 19.91 | |
| J550 | 899.35 | 898.20 | 1.15 | 0.0113 | 0.0339 | 294 | J550 | J556 | 18.7 | |
| J556 | 898.46 | 897.31 | 1.15 | 0.0113 | 0.0339 | 293 | J556 | J627 | 23.68 | |
| J627 | 896.7 | 895.55 | 1.15 | 0.0113 | 0.0339 | 292 | J627 | J562 | 22.05 | |
| J562 | 896.38 | 895.23 | 1.15 | 0.0113 | 0.0339 | 291 | J562 | J561 | 20.38 | |
| J561 | 896.08 | 894.93 | 1.15 | 0.0113 | 0.0339 | 290 | J561 | J628 | 19.98 | |
| J628 | 895.06 | 893.91 | 1.15 | 0.0113 | 0.0339 | 289 | J628 | J564 | 19.47 | |
| J564 | 894.07 | 892.92 | 1.15 | 0.0113 | 0.0339 | 288 | J564 | J563 | 18.16 | |
| J563 | 893.46 | 892.31 | 1.15 | 0.0113 | 0.0339 | 287 | J563 | J558 | 35.6 | |
| J558 | 890.79 | 889.64 | 1.15 | 0.0113 | 0.0339 | 286 | J558 | J625 | 20.17 | |
| J625 | 888.25 | 887.10 | 1.15 | 0.0113 | 0.0339 | 285 | J625 | J557 | 17.93 | |
| J557 | 887.68 | 886.53 | 1.15 | 0.0113 | 0.0339 | 284 | J557 | J560 | 27.57 | |
| J560 | 885.93 | 884.78 | 1.15 | 0.0113 | 0.0339 | 283 | J560 | J559 | 29.91 | |
| J559 | 883.79 | 882.64 | 1.15 | 0.0113 | 0.0339 | 282 | J559 | J604 | 23.92 | |

| | DE | ER for 1.76 N | 1LD capa | city STP fo | r Sewerage | Networke | & FSSM | at Kattapana | | |
|------|--------|---------------|----------|-------------|------------|----------|--------|--------------|-------|----|
| | 000 (1 | 001.47 | | 0.0110 | | • • • | | | | |
| J604 | 882.61 | 881.46 | 1.15 | 0.0113 | 0.0339 | 281 | J604 | J626 | 11.91 | |
| J626 | 882.15 | 881.00 | 1.15 | 0.0113 | 0.0339 | 280 | J626 | J631 | 13.79 | |
| J631 | 881.59 | 880.44 | 1.15 | 0.0113 | 0.0339 | 279 | J631 | J603 | 15.8 | |
| J603 | 881.45 | 880.30 | 1.15 | 0.0113 | 0.0339 | 278 | J603 | J606 | 24.14 | |
| J606 | 880.23 | 879.08 | 1.15 | 0.0173 | 0.0519 | 277 | J606 | J605 | 29.99 | |
| J605 | 879.51 | 878.36 | 1.15 | 0.0113 | 0.0339 | 276 | J605 | J600 | 31.11 | |
| J600 | 879.3 | 878.15 | 1.15 | 0.0113 | 0.0339 | 275 | J600 | J659 | 13.1 | |
| J659 | 879.33 | 878.07 | 1.26 | 0.0113 | 0.0339 | 274 | J659 | J602 | 15.73 | DI |
| J602 | 879.77 | 877.98 | 1.79 | 0.0113 | 0.0339 | 271 | J602 | J584 | 7.09 | DM |
| J584 | 879.48 | 877.94 | 1.54 | 0.0113 | 0.0339 | 270 | J584 | J590 | 20.22 | |
| J590 | 878.91 | 877.76 | 1.15 | 0.0113 | 0.0339 | 269 | J590 | J596 | 29.97 | |
| J596 | 878.97 | 877.58 | 1.39 | 0.0113 | 0.0339 | 268 | J596 | J595 | 29.97 | |
| J595 | 879.57 | 877.41 | 2.16 | 0.0113 | 0.0339 | 267 | J595 | J598 | 29.98 | |
| J598 | 880.63 | 877.23 | 3.40 | 0.0113 | 0.0339 | 266 | J598 | J597 | 29.97 | LS |
| J597 | 882.07 | 880.92 | 1.15 | 0.0113 | 0.0339 | 265 | J597 | J592 | 29.93 | |
| J592 | 883.81 | 880.74 | 3.07 | 0.0123 | 0.0369 | 264 | J592 | J591 | 29.96 | |
| J591 | 884.8 | 880.57 | 4.23 | 0.0113 | 0.0339 | 263 | J591 | J594 | 29.9 | LS |
| J594 | 886.76 | 885.61 | 1.15 | 0.0113 | 0.0339 | 262 | J594 | J593 | 29.92 | |
| J593 | 888.91 | 885.43 | 3.48 | 0.0113 | 0.0339 | 261 | J593 | J684 | 29.96 | |
| J684 | 890.1 | 885.26 | 4.84 | 0.0113 | 0.0339 | 260 | J684 | J775 | 29.99 | |
| J775 | 890.72 | 885.08 | 5.64 | 0.0113 | 0.0339 | 259 | J775 | J774 | 29.98 | |
| J774 | 890.17 | 884.91 | 5.26 | 0.0253 | 0.0759 | 258 | J774 | J777 | 20.96 | |
| J777 | 889.05 | 884.78 | 4.27 | 0.0113 | 0.0339 | 257 | J777 | J601 | 22.47 | |
| J601 | 887.42 | 884.65 | 2.77 | 0.0113 | 0.0339 | 256 | J601 | J776 | 28.26 | |
| J776 | 885.06 | 883.91 | 1.15 | 0.0113 | 0.0339 | 760 | J776 | J111 | 19.99 | |
| J111 | 886.26 | 883.79 | 2.47 | 0.0113 | 0.0339 | 759 | J111 | J106 | 27.13 | |
| J106 | 887.25 | 883.63 | 3.62 | 0.0113 | 0.0339 | 758 | J106 | J117 | 4.58 | |
| J117 | 886.9 | 883.61 | 3.29 | 0.0113 | 0.0339 | 757 | J117 | J103 | 12.67 | |
| J103 | 886.07 | 883.53 | 2.54 | 0.0113 | 0.0339 | 756 | J103 | J105 | 3.13 | |
| J105 | 885.6 | 883.51 | 2.09 | 0.0113 | 0.0339 | 755 | J105 | J116 | 12.18 | |
| J116 | 883.82 | 882.67 | 1.15 | 0.0113 | 0.0339 | 754 | J116 | J119 | 29.42 | |
| J119 | 878.04 | 876.89 | 1.15 | 0.0113 | 0.0339 | 753 | J119 | J118 | 29.32 | |
| J118 | 871.72 | 870.57 | 1.15 | 0.0113 | 0.0339 | 752 | J118 | J113 | 29.27 | |
| J113 | 865.26 | 864.11 | 1.15 | 0.0113 | 0.0339 | 751 | J113 | J112 | 29.73 | |
| J112 | 863.46 | 862.31 | 1.15 | 0.0113 | 0.0339 | 750 | J112 | J115 | 29.98 | DM |
| J599 | 881 | 879.85 | 1.15 | 0.0113 | 0.0339 | 273 | J599 | J585 | 30.88 | |
| J585 | 880.69 | 879.54 | 1.15 | 0.0173 | 0.0519 | 272 | J585 | J602 | 20.01 | |
| J258 | 888.6 | 887.45 | 1.15 | 0.0173 | 0.0519 | 736 | J258 | J263 | 28.16 | |
| J263 | 885.71 | 884.56 | 1.15 | 0.0113 | 0.0339 | 735 | J263 | J264 | 22.95 | |
| J264 | 882.67 | 881.52 | 1.15 | 0.0113 | 0.0339 | 734 | J264 | J218 | 25.55 | |
| J218 | 875 | 873.85 | 1.15 | 0.0113 | 0.0339 | 733 | J218 | J261 | 12.76 | |
| J261 | 871.01 | 869.86 | 1.15 | 0.0113 | 0.0339 | 732 | J261 | J215 | 8.17 | |
| J215 | 869.18 | 868.03 | 1.15 | 0.0113 | 0.0339 | 731 | J215 | J216 | 1.77 | |
| J216 | 868.76 | 867.61 | 1.15 | 0.0113 | 0.0339 | 730 | J216 | J221 | 13.89 | |
| J221 | 867.52 | 866.37 | 1.15 | 0.0113 | 0.0339 | 729 | J221 | J222 | 1.93 | |
| J222 | 867.39 | 866.24 | 1.15 | 0.0113 | 0.0339 | 728 | J222 | J262 | 11.43 | |
| J262 | 864.97 | 863.82 | 1.15 | 0.0113 | 0.0339 | 727 | J262 | J217 | 29.99 | |

| 89 896.5 895.35 1.15 0.0113 0.0339 791 J89 J88 29.77 88 896.03 894.88 1.15 0.0113 0.0339 780 J84 187 15.49 877 890.27 889.12 1.15 0.0113 0.0339 787 J86 J100 100.5 100 883.33 871.14 1.15 0.0113 0.0339 785 J99 J102 2.8.6 1010 880.48 1.15 0.0113 0.0339 783 J101 J103 J101 J103 J101 J103 J101 J103 J101 J102 J8.6 J102 J8.5 J92 J83 J101 J101 J103 J101 J103 J103 J101 J103 J103 J101 J129 J8.5 J93 J329 | | DI | ER for 1.76 N | ILD capa | icity STP fo | or Sewerage | Network | & FSSM a | t Kattapana | | _ |
|--|--------------|--------|---------------|----------|--------------|-------------|---------|----------|-------------|-------|---------------|
| 888 896.03 894.88 1.15 0.0113 0.0339 790 J88 J94 29.74 944 892.53 891.12 1.15 0.0113 0.0339 780 J87 J86 4.16 866 889.57 888.42 1.15 0.0113 0.0339 787 J86 J100 J99 22.16 100 888.33 887.18 1.15 0.0113 0.0339 785 J99 J102 28.6 1012 872.47 871.32 1.15 0.0113 0.0339 783 J101 J92 9.8 93 865.39 864.24 1.15 0.0113 0.0339 780 J96 J136 9.48 93 865.39 8.1.5 0.013 0.0339 780 J96 J136 9.48 94 897.78 1.15 0.013 0.0339 760 J70 J16 9.48 72 898.38 897.78 J1.15 0.013 | J217 | 865.03 | 863.64 | 1.39 | 0.0113 | 0.0339 | 726 | J217 | J133 | 18.98 | LS |
| 944 892.53 891.38 1.15 0.0113 0.0339 789 194 J87 15.49 87 890.27 888.12 1.15 0.0113 0.0339 788 187 186 416 86 889.73 884.24 1.15 0.0113 0.0339 785 199 1102 28.6 100 885.33 857.18 1.15 0.0113 0.0339 783 1101 192 2.8.6 101 866.98 865.33 1.15 0.0113 0.0339 782 192 193 356 17.8 92 865.74 864.59 1.15 0.0113 0.0339 780 196 1136 9.48 72 898.33 897.78 1.15 0.0113 0.0339 760 170 170 2.9.9 70 70 890.63 889.48 1.15 0.0113 0.0339 766 173 174 26.59 75 883.2 | J89 | 896.5 | 895.35 | 1.15 | 0.0113 | 0.0339 | 791 | J89 | J88 | 29.97 | |
| 887 890.27 889.12 1.15 0.0113 0.0339 788 J87 J86 J100 100.5 86 889.57 883.42 1.15 0.0113 0.0339 787 J86 J100 J00 J00 S 999 881.47 880.32 1.15 0.0113 0.0339 785 J99 J102 2.8.6 101 866.54 865.53 1.15 0.0113 0.0339 781 J101 J92 9.8 92 865.54 864.54 1.15 0.0113 0.0339 781 J93 J96 J1.78 92 865.53 864.24 1.15 0.0113 0.0339 781 J93 J96 J1.78 96 895.04 883.89 1.15 0.0113 0.0339 769 J69 J70 30.06 72 898.93 897.60 2.31 0.0113 0.0339 761 J75 J76 29.21 76 877.06 875.91 1.15 0.0113 0.0339 764 J74 J97 | J88 | 896.03 | 894.88 | 1.15 | 0.0113 | 0.0339 | 790 | J88 | J94 | 29.74 | |
| 886 889.57 888.42 1.15 0.0113 0.0339 787 J86 J100 100.5 100 888.33 887.18 1.15 0.0113 0.0339 786 J100 J99 29.16 999 881.47 880.32 1.15 0.0113 0.0339 785 J90 J102 28.6 101 866.98 865.83 1.15 0.0113 0.0339 783 J101 J92 9.8 92 865.74 864.59 1.15 0.0113 0.0339 781 J93 J96 17.8 93 865.54 863.89 1.15 0.0113 0.0339 780 J96 J136 9.48 72 898.63 897.760 2.31 0.0113 0.0339 761 J75 J76 29.21 76 877.06 875.91 1.15 0.0113 0.0339 763 J74 26.59 74 866.61 865.46 1.15 0.011 | J94 | 892.53 | 891.38 | 1.15 | 0.0113 | 0.0339 | 789 | J94 | J87 | 15.49 | |
| 100 888.33 887.18 1.15 0.0113 0.0339 786 J100 J99 29.16 99 881.47 880.32 1.15 0.0113 0.0339 785 J99 J102 28.6 101 866.98 865.83 1.15 0.0113 0.0339 783 J101 J92 9.8 92 865.74 864.24 1.15 0.0113 0.0339 781 J93 J96 17.88 96 865.04 863.89 1.15 0.0113 0.0339 770 J97 J26 9.48 72 898.93 897.78 1.15 0.0113 0.0339 770 J69 J70 30.06 78 863.2 882.05 1.15 0.0113 0.0339 766 J74 26.59 773 29.39 75 883.2 882.05 1.15 0.0113 0.0339 764 J74 J97 13.7 76 877.06 875.91 1.15 0.0113 0.0339 761 J97 J98 29.98 | J87 | 890.27 | 889.12 | 1.15 | 0.0113 | 0.0339 | 788 | J87 | J86 | 4.16 | |
| 999 881.47 880.32 1.15 0.0113 0.0339 785 199 J102 28.6 102 872.47 871.32 1.15 0.0113 0.0339 784 J101 J92 9.8 92 865.74 864.9 1.15 0.0113 0.0339 781 J93 J96 17.88 92 865.74 864.24 1.15 0.0113 0.0339 780 J96 J136 9.48 96 869.91 897.60 2.31 0.0113 0.0339 769 J69 J70 30.06 70 890.63 889.78 1.15 0.0113 0.0339 760 J75 J76 22.9 75 883.2 882.05 1.15 0.0113 0.0339 765 J73 J74 26.59 74 866.61 865.44 1.15 0.0113 0.0339 761 J97 J83 J99 J98 29.98 J98 J999 99 | J86 | 889.57 | 888.42 | 1.15 | 0.0113 | 0.0339 | 787 | J86 | J100 | 10.05 | |
| 1102 872.47 871.32 1.15 0.0113 0.0339 784 J102 J101 J80 101 866.98 865.83 1.15 0.0113 0.0339 783 J101 J92 9.8 92 865.74 864.44 1.15 0.0113 0.0339 780 J96 J136 9.48 93 865.39 804.24 1.15 0.0113 0.0339 780 J96 J136 9.48 96 865.04 863.89 1.15 0.0113 0.0339 760 J70 30.06 70 890.63 889.48 1.15 0.0113 0.0339 766 J75 J76 29.21 76 877.06 875.91 1.15 0.0113 0.0339 764 J74 26.59 74 866.1 85.46 1.15 0.0113 0.0339 761 J75 J131 21.28 97 865.1 863.95 1.15 0.0113 0.0339 761 J95 J131 21.28 98 864.09 862.9 | J100 | 888.33 | 887.18 | 1.15 | 0.0113 | 0.0339 | 786 | J100 | J99 | 29.16 | |
| 1101 866.98 865.83 1.15 0.0113 0.0339 783 J101 J92 9.8 92 865.74 864.59 1.15 0.0113 0.0339 781 J93 J96 17.88 93 865.94 863.94 1.15 0.0113 0.0339 781 J93 J96 17.8 96 865.04 863.89 1.15 0.0113 0.0339 760 J69 J70 30.06 72 898.93 897.78 1.15 0.0113 0.0339 769 J69 J70 30.06 73 883.2 882.05 1.15 0.0113 0.0339 766 J76 J73 29.39 73 871.19 870.04 1.15 0.0113 0.0339 764 J74 J74 26.59 74 866.1 865.44 1.15 0.0113 0.0339 761 J97 J98 29.98 98 864.09 862.33 1.15 0.0113 0.0339 64 J281 J282 29.97 128 | J99 | 881.47 | 880.32 | 1.15 | 0.0113 | 0.0339 | 785 | J99 | J102 | 28.6 | |
| 922 865.74 864.59 1.15 0.0113 0.0339 782 J92 J93 13.29 933 865.39 864.24 1.15 0.0113 0.0339 781 J93 J96 17.88 966 865.04 863.89 1.15 0.0113 0.0339 780 J96 J136 9.48 72 898.93 897.78 1.15 0.0113 0.0339 769 J69 J70 30.06 70 890.63 889.48 1.15 0.0113 0.0339 766 J76 J75 Z8.9 75 883.2 882.05 1.15 0.0113 0.0339 765 J73 J74 26.59 74 866.61 865.46 1.15 0.0113 0.0339 761 J97 J98 29.98 98 864.09 862.33 1.15 0.0113 0.0339 761 J95 J131 21.28 104 892.36 891.21 1.15 <td>J102</td> <td>872.47</td> <td>871.32</td> <td>1.15</td> <td>0.0113</td> <td>0.0339</td> <td>784</td> <td>J102</td> <td>J101</td> <td>18.07</td> <td></td> | J102 | 872.47 | 871.32 | 1.15 | 0.0113 | 0.0339 | 784 | J102 | J101 | 18.07 | |
| 93 865.39 864.24 1.15 0.0113 0.0339 781 J93 J96 17.88 96 865.04 865.89 1.15 0.0113 0.0339 780 J96 J136 9.48 72 898.93 897.78 1.15 0.0113 0.0339 769 J69 J70 30.06 69 899.043 889.48 1.15 0.0113 0.0339 768 J70 J75 28.9 75 883.2 882.05 1.15 0.0113 0.0339 761 J73 J74 26.59 74 866.61 865.46 1.15 0.0113 0.0339 764 J74 J97 J3.7 97 865.1 862.94 1.15 0.0113 0.0339 761 J98 J95 B.99 98 864.09 862.94 Jn-Idukk Vellayam 98 864.09 862.31 1.15 0.0113 0.0339 65 J104 J281 2421 | J101 | 866.98 | 865.83 | 1.15 | 0.0113 | 0.0339 | 783 | J101 | J92 | 9.8 | |
| 996 865.04 863.89 1.15 0.0113 0.0339 780 J96 J136 9.48 72 898.93 897.78 1.15 0.0573 0.1719 770 172 J69 29.98 69 899.91 897.60 2.31 0.0113 0.0339 769 J69 J70 30.66 70 890.63 889.48 1.15 0.0113 0.0339 766 J75 J75 29.39 75 883.2 882.05 1.15 0.0113 0.0339 764 J74 26.59 74 866.1 865.46 1.15 0.0113 0.0339 761 J77 J98 29.98 98 864.09 862.94 1.15 0.0113 0.0339 761 J95 J131 Vellayam 104 892.36 891.21 1.15 0.0113 0.0339 64 J281 J282 29.97 282 888.41 887.26 1.15 0.01 | J92 | 865.74 | 864.59 | 1.15 | 0.0113 | 0.0339 | 782 | J92 | J93 | 13.29 | |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | J93 | 865.39 | 864.24 | 1.15 | 0.0113 | 0.0339 | 781 | J93 | J96 | 17.88 | |
| 669 899.91 897.60 2.31 0.0113 0.0339 769 J69 J70 30.06 70 890.63 889.48 1.15 0.0113 0.0339 768 J70 J75 28.9 75 883.2 882.05 1.15 0.0113 0.0339 767 J75 J76 29.3 76 877.06 875.91 1.15 0.0113 0.0339 765 J73 J74 26.59 774 866.61 865.46 1.15 0.0113 0.0339 761 J97 J98 29.98 98 864.09 862.94 1.15 0.0113 0.0339 761 J95 J131 21.28 99 863.48 862.33 1.15 0.0113 0.0339 64 J81 J242 Jn-Idukka 281 891.15 890.00 1.15 0.0113 0.0339 63 J283 J282 29.97 282 884.1 887.26 1.15 0.0113 0.0339 61 J275 J274 29.95 2 | J96 | 865.04 | 863.89 | 1.15 | 0.0113 | 0.0339 | 780 | J96 | J136 | 9.48 | |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | J72 | 898.93 | 897.78 | 1.15 | 0.0573 | 0.1719 | 770 | J72 | J69 | 29.98 | |
| 70 890.63 889.48 1.15 0.0113 0.0339 768 J70 J75 28.9 75 883.2 882.05 1.15 0.0113 0.0339 767 J75 J76 29.21 76 877.06 875.91 1.15 0.0113 0.0339 766 J76 J73 29.39 73 871.19 870.04 1.15 0.0113 0.0339 763 J74 J97 13.7 977 865.1 863.48 862.33 1.15 0.0113 0.0339 761 J95 J131 L28 998 864.09 862.94 1.15 0.0113 0.0339 761 J95 J131 L28 104 892.36 891.21 1.15 0.0113 0.0339 65 J104 J281 24.21 Jn-Idukka 281 891.15 890.00 1.15 0.0113 0.0339 61 J275 J274 29.95 275 886.72 885.57 1.15 0.0113 0.0339 58 J276 J274 <td< td=""><td>J69</td><td></td><td></td><td></td><td></td><td></td><td>769</td><td></td><td></td><td></td><td></td></td<> | J69 | | | | | | 769 | | | | |
| 75 883.2 882.05 1.15 0.0113 0.0339 767 175 176 29.21 76 877.06 875.91 1.15 0.0113 0.0339 766 173 173 29.39 73 871.19 870.04 1.15 0.0113 0.0339 766 173 174 26.59 74 866.61 865.46 1.15 0.0113 0.0339 761 174 197 13.7 97 865.1 863.95 1.15 0.0113 0.0339 761 195 1131 21.28 98 864.09 862.94 1.15 0.0113 0.0339 761 195 1131 21.28 104 892.36 891.21 1.15 0.0113 0.0339 63 1283 1282 29.97 282 888.41 887.26 1.15 0.0113 0.0339 64 1281 1283 29.92 275 886.72 885.57 1.15 0.0113 0.0339 61 1275 1274 29.92 276 | J70 | | | | | | | | | | |
| 76 877.06 875.91 1.15 0.0113 0.0339 766 J76 J73 29.39 73 871.19 870.04 1.15 0.0113 0.0339 765 J73 J74 26.59 74 866.61 865.46 1.15 0.0113 0.0339 764 J74 J97 13.7 977 865.1 863.95 1.15 0.0113 0.0339 764 J74 J97 13.7 997 865.1 863.95 1.15 0.0113 0.0339 761 J95 J131 21.28 918 864.09 862.33 1.15 0.0113 0.0339 64 J281 J283 29.96 104 892.36 891.21 1.5 0.0113 0.0339 64 J281 J283 29.96 283 889.73 888.58 1.15 0.0113 0.0339 64 J281 J283 29.97 282 888.41 887.26 1.15 0.0113 0.0339 61 J274 J29.92 29.97 | J75 | | | | | | | | | | |
| 74 866.61 865.46 1.15 0.0113 0.0339 764 J74 J97 13.7 997 865.1 863.95 1.15 0.0113 0.0339 763 J97 J98 29.98 998 864.09 862.94 1.15 0.0113 0.0339 761 J95 J131 21.28 995 863.48 862.33 1.15 0.0113 0.0339 761 J95 J131 21.28 104 892.36 891.21 1.15 0.0113 0.0339 65 J104 J281 24.21 Jn-Idukka 281 891.15 890.00 1.15 0.0113 0.0339 63 J283 J282 29.97 282 888.41 887.26 1.15 0.0113 0.0339 60 J274 J276 29.92 275 886.72 885.57 1.15 0.0113 0.0339 59 J276 J278 29.92 276 882.77 881.62 1.15 0.0113 0.0339 58 J278 J277 24.98 | J76 | 877.06 | 875.91 | 1.15 | 0.0113 | 0.0339 | 766 | J76 | J73 | 29.39 | |
| 74 866.61 865.46 1.15 0.0113 0.0339 764 J74 J97 13.7 997 865.1 863.95 1.15 0.0113 0.0339 763 J97 J98 29.98 998 864.09 862.94 1.15 0.0113 0.0339 761 J95 J131 21.28 995 863.48 862.33 1.15 0.0113 0.0339 761 J95 J131 21.28 104 892.36 891.21 1.15 0.0113 0.0339 65 J104 J281 24.21 Jn-Idukka 281 891.15 890.00 1.15 0.0113 0.0339 63 J283 J282 29.97 282 888.41 887.26 1.15 0.0113 0.0339 60 J274 J276 29.92 275 886.72 885.57 1.15 0.0113 0.0339 59 J276 J278 29.92 276 882.77 881.62 1.15 0.0113 0.0339 58 J278 J277 24.98 | J73 | | | | | | | | | | |
| 997 865.1 863.95 1.15 0.0113 0.0339 763 J97 J98 29.98 998 864.09 862.94 1.15 0.0113 0.0339 762 J98 J95 19.99 995 863.48 862.33 1.15 0.0113 0.0339 761 J95 J131 21.28 Vellayam 104 892.36 891.21 1.15 0.0113 0.0339 65 J104 J281 24.21 Jn-ldukk 281 891.15 890.00 1.15 0.0113 0.0339 63 J283 J282 29.97 282 888.41 887.26 1.15 0.0113 0.0339 61 J275 J274 29.95 275 886.72 885.57 1.15 0.0113 0.0339 60 J274 J276 29.92 274 885.03 883.88 1.15 0.0113 0.0339 58 J278 J277 24.98 277 878.9 877.64 1.15 0.0113 0.0339 55 J291 J290 </td <td>J74</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>J97</td> <td></td> <td></td> | J74 | | | | | | | | J97 | | |
| 998 864.09 862.94 1.15 0.0113 0.0339 762 J98 J95 19.99 995 863.48 862.33 1.15 0.0113 0.0339 761 J95 J131 21.28 Vellayam 104 892.36 891.21 1.15 0.0113 0.0339 65 J104 J281 24.21 In-Iduká 281 891.15 890.00 1.15 0.0113 0.0339 63 J283 J282 29.97 283 889.73 888.58 1.15 0.0113 0.0339 61 J275 J274 29.95 275 886.72 885.57 1.15 0.0113 0.0339 60 J274 J276 29.92 276 882.77 881.62 1.15 0.0113 0.0339 58 J278 J277 24.98 277 878.79 877.64 1.15 0.0113 0.0339 57 J277 J284 24.22 284 877.38 876.23 1.15 0.0113 0.0339 55 J291 J29 | 197 | | | | | | | | | | |
| 95 863.48 862.33 1.15 0.0113 0.0339 761 J95 J131 21.28 Vellayam 1104 892.36 891.21 1.15 0.0113 0.0339 65 J104 J281 24.21 Jn-Idukki 281 891.15 890.00 1.15 0.0113 0.0339 64 J281 J283 29.96 283 889.73 888.58 1.15 0.0113 0.0339 61 J275 29.97 29.97 282 888.41 887.26 1.15 0.0113 0.0339 61 J275 J274 29.95 275 886.72 885.57 1.15 0.0113 0.0339 60 J274 J276 29.92 276 882.77 881.62 1.15 0.0113 0.0339 58 J278 J277 24.98 277 878.79 877.64 1.15 0.0113 0.0339 57 J271 J284 24.22 284 877.38 876.23 1.15 0.0113 0.0339 53 J291 | 198 | | | | | | | | | | |
| 1104 892.36 891.21 1.15 0.0113 0.0339 65 J104 J281 24.21 Jn-Idukka 281 891.15 890.00 1.15 0.0113 0.0339 64 J281 J283 29.96 283 889.73 888.58 1.15 0.0113 0.0339 63 J283 J282 29.97 282 888.41 887.26 1.15 0.0113 0.0339 61 J275 J274 29.95 275 886.72 885.57 1.15 0.0113 0.0339 60 J274 J276 29.92 276 882.77 881.62 1.15 0.0113 0.0339 58 J278 J277 24.98 277 878.79 877.64 1.15 0.0113 0.0339 57 J277 J284 24.22 284 877.38 876.23 1.15 0.0113 0.0339 55 J291 J290 29.98 290 874.6 873.45 1.15 0.0113 0.0339 53 J292 J294 29.98 | J95 | | | | | | | | | | V 7 11 |
| 2283 889.73 888.58 1.15 0.0113 0.0339 63 J283 J282 29.97 2282 888.41 887.26 1.15 0.0113 0.0339 62 J282 J275 29.95 275 886.72 885.57 1.15 0.0113 0.0339 61 J275 J274 29.95 274 885.03 883.88 1.15 0.0113 0.0339 60 J274 J276 29.92 276 882.77 881.62 1.15 0.0113 0.0339 59 J276 J278 29.92 278 880.55 879.40 1.15 0.0113 0.0339 58 J277 J284 24.22 284 877.38 876.23 1.15 0.0113 0.0339 55 J291 J290 29.98 290 874.6 873.45 1.15 0.0113 0.0339 53 J292 J294 29.98 294 875.17 873.10 2.07 0.0113 0.0339 53 J292 J294 29.98 | J104 | 892.36 | 891.21 | 1.15 | 0.0113 | 0.0339 | 65 | J104 | J281 | 24.21 | Jn-Idukki l |
| 282 888.41 887.26 1.15 0.0113 0.0339 62 J282 J275 29.95 275 886.72 885.57 1.15 0.0113 0.0339 61 J275 J274 29.95 274 885.03 883.88 1.15 0.0113 0.0339 60 J274 J276 29.92 276 882.77 881.62 1.15 0.0113 0.0339 58 J278 J277 24.98 277 878.79 877.64 1.15 0.0113 0.0339 57 J277 J284 24.22 284 877.38 876.23 1.15 0.0113 0.0339 55 J291 J290 29.98 290 874.6 873.45 1.15 0.0113 0.0339 54 J290 J292 29.97 292 874.45 873.27 1.18 0.0113 0.0339 53 J292 J294 29.98 294 875.17 873.10 2.07 0.0113 0.0339 51 J293 J286 24.57 | J281 | 891.15 | 890.00 | 1.15 | 0.0113 | 0.0339 | 64 | J281 | J283 | 29.96 | |
| 275886.72885.571.150.01130.033961J275J27429.95274885.03883.881.150.01130.033960J274J27629.92276882.77881.621.150.01130.033959J276J27829.92278880.55879.401.150.01130.033958J277J28424.22284877.38876.231.150.01130.033956J284J29140.64291875.5874.351.150.01130.033955J291J29029.98290874.6873.451.150.01130.033954J290J29229.97292874.45873.271.180.01130.033953J292J29429.98294875.17873.102.070.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.88287883.89879.933.960.01130.033948J287J28929.9288886.61879.541.150.01130.033947J289J29637.86296880.69879.541.150.01130.033945J288J25929.92 | J283 | 889.73 | 888.58 | 1.15 | 0.0113 | 0.0339 | 63 | J283 | J282 | 29.97 | |
| 2274885.03883.881.150.01130.033960J274J27629.922276882.77881.621.150.01130.033959J276J27829.922278880.55879.401.150.01130.033958J277J28424.222278880.55879.401.150.01130.033957J277J28424.222284877.38876.231.150.01130.033956J284J29140.64291875.5874.351.150.01130.033955J291J29029.98290874.6873.451.150.01130.033954J290J29229.97292874.45873.271.180.01130.033953J292J29429.98294875.17873.102.070.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS287883.89879.933.960.01130.033948J287J28929.99289886.31879.766.550.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J259 <t< td=""><td>J282</td><td>888.41</td><td>887.26</td><td>1.15</td><td>0.0113</td><td>0.0339</td><td>62</td><td>J282</td><td>J275</td><td>29.95</td><td></td></t<> | J282 | 888.41 | 887.26 | 1.15 | 0.0113 | 0.0339 | 62 | J282 | J275 | 29.95 | |
| 2276882.77881.621.150.01130.033959J276J27829.92278880.55879.401.150.01130.033958J278J27724.982277878.79877.641.150.01130.033957J277J28424.22284877.38876.231.150.01130.033956J284J29140.64291875.5874.351.150.01130.033955J291J29029.98290874.6873.451.150.01130.033954J290J29229.97292874.45873.271.180.01130.033953J292J29429.98294875.17873.102.070.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.88287883.89879.933.960.01130.033947J289J29637.86296880.69879.541.150.01130.033947J289J29637.86296880.69879.541.150.01130.033945J288J25929.92298886.31879.646.550.01130.033945J288J25929.92 </td <td>J275</td> <td>886.72</td> <td>885.57</td> <td>1.15</td> <td>0.0113</td> <td>0.0339</td> <td>61</td> <td>J275</td> <td>J274</td> <td>29.95</td> <td></td> | J275 | 886.72 | 885.57 | 1.15 | 0.0113 | 0.0339 | 61 | J275 | J274 | 29.95 | |
| 1278880.55879.401.150.01130.033958J278J27724.981277878.79877.641.150.01130.033957J277J28424.221284877.38876.231.150.01130.033956J284J29140.641291875.5874.351.150.01130.033955J291J29029.981290874.6873.451.150.01130.033954J290J29229.971292874.45873.271.180.01130.033953J292J29429.981294875.17873.102.070.01130.033951J293J28624.571286878.36872.785.580.01130.033950J286J28535.17LS1286878.36872.785.580.01130.033949J285J28729.881287883.89879.933.960.01130.033948J287J28929.91289886.31879.766.550.01130.033947J289J29637.861296880.69879.541.150.01130.033946J296J28822.05LS1288888.96887.811.150.01130.033945J288J25929.921259888.19887.041.150.01130.033944J259J25 | J274 | 885.03 | 883.88 | 1.15 | 0.0113 | 0.0339 | 60 | J274 | J276 | 29.92 | |
| 2277878.79877.641.150.01130.033957J277J28424.22284877.38876.231.150.01130.033956J284J29140.641291875.5874.351.150.01130.033955J291J29029.981290874.6873.451.150.01130.033954J290J29229.971292874.45873.271.180.01130.033953J292J29429.981294875.17873.102.070.01130.033952J294J29329.941293876.57872.923.650.01130.033951J293J28624.571286878.36872.785.580.01130.033950J286J28535.17LS1285881.26880.111.150.01130.033949J285J28729.881287883.89879.933.960.01130.033948J287J28929.91289886.31879.766.550.01130.033947J289J29637.861296880.69879.541.150.01130.033946J296J28822.05LS1288888.96887.811.150.01130.033945J288J25929.921259888.19887.041.150.01130.033944J259J258 | J276 | 882.77 | 881.62 | 1.15 | 0.0113 | 0.0339 | 59 | J276 | J278 | 29.92 | |
| 2277878.79877.641.150.01130.033957J277J28424.22284877.38876.231.150.01130.033956J284J29140.641291875.5874.351.150.01130.033955J291J29029.981290874.6873.451.150.01130.033954J290J29229.971292874.45873.271.180.01130.033953J292J29429.981294875.17873.102.070.01130.033952J294J29329.941293876.57872.923.650.01130.033951J293J28624.571286878.36872.785.580.01130.033950J286J28535.17LS1285881.26880.111.150.01130.033949J285J28729.881287883.89879.933.960.01130.033948J287J28929.91289886.31879.766.550.01130.033947J289J29637.861296880.69879.541.150.01130.033946J296J28822.05LS1288888.96887.811.150.01130.033945J288J25929.921259888.19887.041.150.01130.033944J259J258 | J278 | 880.55 | 879.40 | 1.15 | 0.0113 | 0.0339 | 58 | J278 | J277 | 24.98 | |
| 291875.5874.351.150.01130.033955J291J29029.98290874.6873.451.150.01130.033954J290J29229.97292874.45873.271.180.01130.033953J292J29429.98294875.17873.102.070.01130.033952J294J29329.94293876.57872.923.650.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.98287883.89879.933.960.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J25929.92299888.19887.041.150.01130.033944J259J25829.99 | J277 | | 877.64 | 1.15 | 0.0113 | 0.0339 | 57 | J277 | | 24.22 | |
| 291875.5874.351.150.01130.033955J291J29029.98290874.6873.451.150.01130.033954J290J29229.97292874.45873.271.180.01130.033953J292J29429.98294875.17873.102.070.01130.033952J294J29329.94293876.57872.923.650.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.98287883.89879.933.960.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J25929.92299888.19887.041.150.01130.033944J259J25829.99 | J284 | 877.38 | 876.23 | 1.15 | 0.0113 | 0.0339 | 56 | J284 | J291 | 40.64 | |
| 290874.6873.451.150.01130.033954J290J29229.97292874.45873.271.180.01130.033953J292J29429.98294875.17873.102.070.01130.033952J294J29329.94293876.57872.923.650.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.88287883.89879.933.960.01130.033948J287J28929.9289886.31879.766.550.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J25929.92259888.19887.041.150.01130.033944J259J25829.99 | J291 | | | | | | 55 | | | | |
| 292874.45873.271.180.01130.033953J292J29429.98294875.17873.102.070.01130.033952J294J29329.94293876.57872.923.650.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.88287883.89879.933.960.01130.033948J287J28929.9289886.31879.766.550.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033944J259J25829.99259888.19887.041.150.01130.033944J259J25829.99 | J290 | | | | | | | | | | |
| 294875.17873.102.070.01130.033952J294J29329.94293876.57872.923.650.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.88287883.89879.933.960.01130.033948J287J28929.9289886.31879.766.550.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J25929.92259888.19887.041.150.01130.033944J259J25829.99 | J292 | | | | | | | | | | |
| 293876.57872.923.650.01130.033951J293J28624.57286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.88287883.89879.933.960.01130.033948J287J28929.9289886.31879.766.550.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J25929.92259888.19887.041.150.01130.033944J259J25829.99 | J294 | | | | | | | | | | |
| 286878.36872.785.580.01130.033950J286J28535.17LS285881.26880.111.150.01130.033949J285J28729.88287883.89879.933.960.01130.033948J287J28929.9289886.31879.766.550.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J25929.92259888.19887.041.150.01130.033944J259J25829.99 | J293 | | | | | | | | | | |
| 2285 881.26 880.11 1.15 0.0113 0.0339 49 J285 J287 29.88 2287 883.89 879.93 3.96 0.0113 0.0339 48 J287 J289 29.9 2289 886.31 879.76 6.55 0.0113 0.0339 47 J289 J296 37.86 2296 880.69 879.54 1.15 0.0113 0.0339 46 J296 J288 22.05 LS 2288 888.96 887.81 1.15 0.0113 0.0339 45 J288 J259 29.92 2259 888.19 887.04 1.15 0.0113 0.0339 44 J259 J258 29.99 | J286 | | | | | | | | | | LS |
| 287883.89879.933.960.01130.033948J287J28929.9289886.31879.766.550.01130.033947J289J29637.86296880.69879.541.150.01130.033946J296J28822.05LS288888.96887.811.150.01130.033945J288J25929.92259888.19887.041.150.01130.033944J259J25829.99 | J285 | | | | | | | | | | |
| 289 886.31 879.76 6.55 0.0113 0.0339 47 J289 J296 37.86 296 880.69 879.54 1.15 0.0113 0.0339 46 J296 J288 22.05 LS 288 888.96 887.81 1.15 0.0113 0.0339 45 J288 J259 29.92 259 888.19 887.04 1.15 0.0113 0.0339 44 J259 J258 29.99 | | | | | | | | | | | |
| 296880.69879.541.150.01130.033946J296J28822.05LS1288888.96887.811.150.01130.033945J288J25929.921259888.19887.041.150.01130.033944J259J25829.99 | | | | | | | | | | | |
| 1288888.96887.811.150.01130.033945J288J25929.921259888.19887.041.150.01130.033944J259J25829.99 | | | | | | | | | | | LS |
| 259 888.19 887.04 1.15 0.0113 0.0339 44 J259 J258 29.99 | | | | | | | | | | | 10 |
| | | | | | | | | | | | |
| | J259 J258 | 887.73 | 886.58 | 1.15 | 0.0113 | 0.0339 | 43 | J259 | J260 | 29.99 | |
| | | | | | | | | | | | |

| | DE | ER for 1.76 N | ILD capa | city STP fo | r Sewerage | Network | & FSSM | at Kattapana | | |
|--------------|------------------|------------------|--------------|-------------|------------|---------|--------------|--------------|------------|----|
| J260 | 887.51 | 886.36 | 1.15 | 0.0113 | 0.0339 | 42 | J260 | J262 | 29.29 | |
| J260 J262 | 887.85 | 886.19 | 1.66 | 0.0113 | 0.0339 | 41 | J260 | J261 | 29.84 | |
| J261 | 888.55 | 886.01 | 2.54 | 0.0113 | 0.0339 | 40 | J261 | J254 | 29.99 | |
| J254 | 888.78 | 885.84 | 2.94 | 0.0113 | 0.0339 | 39 | J254 | J254 J253 | 29.97 | |
| J253 | 888.68 | 885.66 | 3.02 | 0.0113 | 0.0339 | 38 | J254 | J255 | 29.99 | |
| J255 | 888.08 | 885.48 | 2.60 | 0.0113 | 0.0339 | 37 | J255 | J257 | 29.97 | |
| J255 J257 | 887.2 | 885.31 | 1.89 | 0.0113 | 0.0339 | 36 | J255 J257 | J256 | 29.98 | |
| J256 | 886.18 | 885.03 | 1.15 | 0.0113 | 0.0339 | 35 | J256 | J263 | 29.99 | |
| J263 | 885.78 | 884.63 | 1.15 | 0.0113 | 0.0339 | 34 | J263 | J270 | 29.91 | |
| J270 | 885.46 | 884.31 | 1.15 | 0.0113 | 0.0339 | 33 | J270 | J269 | 29.96 | |
| J269 | 885.04 | 883.89 | 1.15 | 0.0113 | 0.0339 | 32 | J269 | J271 | 29.25 | |
| J271 | 884.99 | 883.72 | 1.27 | 0.0113 | 0.0339 | 31 | J271 | J273 | 29.98 | |
| J273 | 885.83 | 883.54 | 2.29 | 0.0113 | 0.0339 | 30 | J273 | J272 | 30 | |
| J272 | 886.2 | 883.37 | 2.83 | 0.0113 | 0.0339 | 29 | J272 | J265 | 29.86 | |
| J265 | 886.3 | 883.19 | 3.11 | 0.0113 | 0.0339 | 28 | J265 | J264 | 29.77 | |
| J264 | 886.74 | 883.01 | 3.73 | 0.0113 | 0.0339 | 27 | J264 | J266 | 29.54 | |
| J266 | 887.09 | 882.84 | 4.25 | 0.0113 | 0.0339 | 26 | J266 | J268 | 25.56 | |
| J268 | 886.75 | 882.69 | 4.06 | 0.0113 | 0.0339 | 25 | J268 | J267 | 34.41 | |
| J267 | 886.43 | 882.49 | 3.94 | 0.0113 | 0.0339 | 24 | J267 | J322 | 30 | |
| J322 | 886.29 | 882.31 | 3.98 | 0.0113 | 0.0339 | 23 | J322 | J321 | 29.95 | |
| J321 | 886.28 | 885.13 | 1.15 | 0.0113 | 0.0339 | 23 | J321 | J323 | 29.98 | |
| J323 | 886.14 | 884.95 | 1.19 | 0.0113 | 0.0339 | 21 | J323 | J325 | 29.98 | |
| J325 | 886.03 | 884.78 | 1.25 | 0.0113 | 0.0339 | 20 | J325 | J324 | 29.85 | |
| J324 | 886.18 | 884.60 | 1.58 | 0.0113 | 0.0339 | 19 | J324 | J317 | 29.9 | |
| J317 | 886.07 | 884.43 | 1.64 | 0.0113 | 0.0339 | 18 | J317 | J316 | 29.55 | |
| J316 | 886.05 | 884.25 | 1.80 | 0.0113 | 0.0339 | 17 | J316 | J318 | 29.99 | |
| J318 | 886.14 | 884.08 | 2.06 | 0.0113 | 0.0339 | 16 | J318 | J320 | 29.94 | |
| J320 | 886.04 | 883.90 | 2.00 | 0.0113 | 0.0339 | 15 | J320 | J86 | 12.52 | |
| J86 | 886.09 | 883.83 | 2.14 | 0.0113 | 0.0339 | 13 | J86 | J319 | 16.32 | |
| J319 | 885.96 | 883.73 | 2.20 | 0.0113 | 0.0339 | 13 | J319 | J326 | 30 | |
| J326 | 886.13 | 883.55 | 2.58 | 0.0113 | 0.0339 | 12 | J326 | J333 | 29.88 | |
| J333 | 886.08 | 883.38 | 2.70 | 0.0113 | 0.0339 | 11 | J333 | J335 J332 | 29.93 | |
| J333 J332 | 886.28 | 883.20 | 3.08 | 0.0113 | 0.0339 | 10 | J332 | J332 J334 | 29.93 | |
| J332 J334 | 886.32 | 883.03 | 3.29 | 0.0113 | 0.0339 | 9 | J332 J334 | J334 J336 | 29.3 30 | |
| J334 J336 | 886.07 | 883.03 | 3.29 | 0.0113 | 0.0339 | 8 | J334 J336 | J336 J335 | 30 30 | |
| J335 | 885.88 | 882.68 | 3.22 | 0.0113 | 0.0339 | 8 7 | J335 | J335 J328 | 30 30 | |
| J328 | 885.7 | 882.50 | 3.20 | 0.0113 | 0.0339 | 6 | J328 | J328 J327 | 32.34 | |
| J328 J327 | 885.62 | 882.30 | 3.31 | 0.0113 | 0.0339 | 5 | J328 J327 | J327 J329 | 27.65 | |
| J327 J329 | 885.43 | 882.31 | 3.28 | 0.0113 | 0.0339 | 4 | J327 J329 | J329 J331 | 27.03 | |
| J329 J331 | 885.45 884.69 | 882.13 881.97 | 5.28 2.72 | 0.0113 | 0.0339 | 4 | J329 J331 | J331 J330 | 29.98 | |
| J331 J330 | 883.24 | 881.79 | 1.45 | 0.1123 | 0.0339 | 2 | J330 | J330 J301 | 29.82 | |
| J301 | 882.08 | 880.93 | 1.45 | 0.01123 | 0.0339 | 2 1 | J301 | J301 J300 | 29.93 | |
| J300 J300 | 882.08 881.11 | 880.93 879.96 | 1.15 | 0.0113 | 0.0339 | 457 | J301 J300 | J599 | | DN |
| 3500 | 001.11 | 012.20 | 1.13 | 2.3729 | 7.1187 | 1.6т | 3300 | 3377 | 10 | |

<u>Kattapana Network-Well zone -4</u>

DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana

| | [NODE] | | | | | | [| [CONDUITS] | | |
|------|-----------|-----------|--------|--------|--------------|---------|------|------------|--------|----|
| Node | Ground | Invert | Depth | DWF | Peak Flow | Conduit | From | | | |
| ID | Elevation | Elevation | of Cut | (LPS) | (LPS) | ID | Node | To Node | Length | |
| J290 | 895.27 | 894.12 | 1.15 | 0.0113 | 0.0339 | 1043 | J290 | J285 | 29.73 | |
| J285 | 891.82 | 890.67 | 1.15 | 0.0163 | 0.0489 | 1042 | J285 | J284 | 29.74 | |
| J284 | 888.39 | 887.24 | 1.15 | 0.0113 | 0.0339 | 1041 | J284 | J287 | 29.74 | |
| J287 | 885.61 | 884.46 | 1.15 | 0.0113 | 0.0339 | 1040 | J287 | J286 | 29.98 | |
| J286 | 884.55 | 883.40 | 1.15 | 0.0113 | 0.0339 | 1039 | J286 | J288 | 19.57 | |
| J288 | 884.08 | 882.93 | 1.15 | 0.0113 | 0.0339 | 1038 | J288 | J331 | 19.72 | |
| J331 | 885.77 | 882.81 | 2.96 | 0.0113 | 0.0339 | 1037 | J331 | J330 | 19.86 | |
| J330 | 880.5 | 879.35 | 1.15 | 0.0113 | 0.0339 | 1036 | J330 | J333 | 29.88 | |
| J333 | 878.08 | 876.93 | 1.15 | 0.0113 | 0.0339 | 1035 | J333 | J332 | 29.99 | |
| J332 | 878.34 | 876.75 | 1.59 | 0.0113 | 0.0339 | 1034 | J332 | J327 | 29.83 | |
| J327 | 880.4 | 876.58 | 3.82 | 0.0113 | 0.0339 | 1033 | J327 | J326 | 29.8 | |
| J326 | 881.94 | 876.40 | 5.54 | 0.0113 | 0.0339 | 1032 | J326 | J329 | 29.96 | |
| J329 | 881.18 | 876.23 | 4.95 | 0.0113 | 0.0339 | 1031 | J329 | J328 | 30 | |
| J328 | 880.99 | 876.05 | 4.94 | 0.0113 | 0.0339 | 1030 | J328 | J334 | 30 | |
| J334 | 881.44 | 875.87 | 5.57 | 0.0113 | 0.0339 | 1029 | J334 | J340 | 29.99 | LS |
| J340 | 882.22 | 881.07 | 1.15 | 0.0113 | 0.0339 | 1028 | J340 | J339 | 29.98 | |
| J339 | 883.24 | 880.89 | 2.35 | 0.0113 | 0.0339 | 1027 | J339 | J342 | 24.69 | |
| J342 | 883.86 | 880.75 | 3.11 | 0.0113 | 0.0339 | 1015 | J342 | J410 | 11.66 | |
| J410 | 883.7 | 880.68 | 3.02 | 0.0113 | 0.0339 | 1014 | J410 | J407 | 29.61 | |
| J407 | 881.76 | 880.51 | 1.25 | 0.0113 | 0.0339 | 1013 | J407 | J408 | 29.57 | |
| J408 | 876.8 | 875.65 | 1.15 | 0.0113 | 0.0339 | 1012 | J408 | J402 | 29.47 | |
| J402 | 873.71 | 872.56 | 1.15 | 0.0113 | 0.0339 | 1011 | J402 | J396 | 29.98 | |
| J396 | 872.68 | 871.53 | 1.15 | 0.0113 | 0.0339 | 1010 | J396 | J397 | 29.99 | |
| J397 | 872.84 | 871.35 | 1.49 | 0.0113 | 0.0339 | 1009 | J397 | J353 | 9.69 | |
| J353 | 873.42 | 871.30 | 2.12 | 0.0113 | 0.0339 | 996 | J353 | J352 | 12.44 | |
| J352 | 873.09 | 871.22 | 1.87 | 0.0113 | 0.0339 | 997 | J352 | J394 | 13.47 | |
| J394 | 874.02 | 871.14 | 2.88 | 0.0113 | 0.0339 | 998 | J394 | J395 | 29.99 | |
| J395 | 873.47 | 870.97 | 2.50 | 0.0113 | 0.0339 | 999 | J395 | J400 | 29.98 | |
| J400 | 872.52 | 870.79 | 1.73 | 0.0113 | 0.0339 | 1000 | J400 | J401 | 29.93 | |
| J401 | 870.59 | 869.44 | 1.15 | 0.0113 | 0.0339 | 1001 | J401 | J398 | 29.9 | |
| J398 | 869.73 | 868.58 | 1.15 | 0.0163 | 0.0489 | 1002 | J398 | J355 | 20.77 | |
| J355 | 869.93 | 868.46 | 1.47 | 0.0113 | 0.0339 | 1003 | J355 | J354 | 20.01 | |
| J354 | 870.26 | 868.34 | 1.92 | 0.0113 | 0.0339 | 1004 | J354 | J399 | 19.21 | |
| J399 | 870.71 | 868.23 | 2.48 | 0.0163 | 0.0489 | 1005 | J399 | J303 | 29.94 | |
| J387 | 894.22 | 893.07 | 1.15 | 0.0113 | 0.0339 | 963 | J387 | J385 | 19.55 | |
| J385 | 892.72 | 891.57 | 1.15 | 0.0113 | 0.0339 | 962 | J385 | J392 | 19.85 | |
| J392 | 890.29 | 889.14 | 1.15 | 0.0113 | 0.0339 | 961 | J392 | J299 | 26.38 | |
| J299 | 889.52 | 888.37 | 1.15 | 0.0113 | 0.0339 | 960 | J299 | J298 | 29.92 | |
| J298 | 889 | 887.85 | 1.15 | 0.0113 | 0.0339 | 959 | J298 | J293 | 29.71 | |
| J293 | 888.59 | 887.44 | 1.15 | 0.0113 | 0.0339 | 958 | J293 | J292 | 29.88 | |
| J292 | 888.52 | 887.26 | 1.26 | 0.0113 | 0.0339 | 957 | J292 | J295 | 30 | |
| J295 | 888.54 | 887.09 | 1.45 | 0.0113 | 0.0339 | 956 | J295 | J294 | 30 | |

| | DE | CR for 1.76 I | MLD cape | acity STP fo | r Sewerage | Networke | & FSSM | at Kattapana | | |
|--------------|------------------|------------------|----------|--------------|------------|---------------------|--------------|--------------|-------------|-------------|
| J294 | 888.66 | 886.91 | 1.75 | 0.0113 | 0.0339 | 955 | J294 | J300 | 29.98 | |
| J300 | 887.7 | 886.55 | 1.15 | 0.0113 | 0.0339 | 954 | J300 | J306 | 29.62 | |
| J306 | 885.07 | 883.92 | 1.15 | 0.0113 | 0.0339 | 953 | J306 | J305 | 29.02 | |
| J305 | 883.15 | 882.00 | 1.15 | 0.0113 | 0.0339 | 952 | J305 | J308 | 28.81 | |
| J308 | 882.4 | 881.25 | 1.15 | 0.0113 | 0.0339 | 946 | J308 | J307 | 31.1 | |
| J307 | 880.93 | 879.78 | 1.15 | 0.0113 | 0.0339 | 945 | J307 | J302 | 29.86 | |
| J302 | 881.61 | 879.60 | 2.01 | 0.0113 | 0.0339 | 944 | J302 | J301 | 29.80 | |
| J301 | 876.53 | 875.38 | 1.15 | 0.0113 | 0.0339 | 943 | J301 | J304 | 29.8 | |
| J304 | 873.62 | 872.47 | 1.15 | 0.0113 | 0.0339 | 243 | J304 | J303 | 25.15 | DM |
| J303 | 872.01 | 868.05 | 3.96 | 0.0113 | 0.0339 | 932 | J303 | J280 | 34.74 | DWI |
| J280 | 872.01 | 867.85 | 3.20 | 0.0113 | 0.0339 | 931 | J280 | J279 | 29.84 | |
| J279 | 869.92 | 867.67 | 2.25 | 0.0113 | 0.0339 | 930 | J279 | J282 | 29.97 | DM |
| J282 | 869.32 | 865.96 | 3.36 | 0.0113 | 0.0339 | 447 | J282 | OUTFALL | 34.34 | DIVI |
| J391 | 894.22 | 893.07 | 1.15 | 0.0113 | 0.0339 | 966 | J391 | J390 | 29.99 | |
| J390 | 894.22 | 893.07 | 1.13 | 0.0113 | 0.0339 | 965 | J390 | J390 J393 | 29.99 30 | |
| J390 J393 | 894.22 894.22 | 892.89 892.72 | 1.55 | 0.0113 | 0.0339 | 903 964 | J390 J393 | J393 J392 | 24.81 | |
| J323 | 894.22 876.84 | 892.72 875.69 | 1.15 | 0.0113 | 0.0339 | 904 908 | J323 | J322 J322 | 24.81 30 | |
| J323 J322 | | 875.51 | 1.15 | 0.0113 | 0.0339 | 908 909 | J323 J322 | J325 | 29.95 | |
| | 876.87 | | | | | 909 910 | | | | |
| J325 | 876.57 | 875.34 | 1.23 | 0.0113 | 0.0339 | | J325 | J324 | 29.98 | |
| J324 | 875.43 | 874.28 | 1.15 | 0.0113 | 0.0339 | 911 012 | J324 | J319 | 29.95 | |
| J319 | 874.5 | 873.35 | 1.15 | 0.0113 | 0.0339 | 912 | J319 | J318 | 29.98 | |
| J318 | 873.34 | 872.19 | 1.15 | 0.0113 | 0.0339 | 913 | J318 | J321 | 29.88 | |
| J321 | 871.85 | 870.70 | 1.15 | 0.0113 | 0.0339 | 914 015 | J321 | J320 | 29.4 | |
| J320 | 868.65 | 867.50 | 1.15 | 0.0113 | 0.0339 | 915 016 | J320 | J411 | 29.52 | |
| J411 | 867.79 | 866.64 | 1.15 | 0.0113 | 0.0339 | 916 017 | J411 | J502 | 29.94 | |
| J502 | 868.74 | 866.46 | 2.28 | 0.0113 | 0.0339 | 917 0 2 9 | J502 | J276 | 22.89 | |
| J276 | 869.95 | 866.33 | 3.62 | 0.0113 | 0.0339 | 928 | J276 | J281 | 32.33 | |
| J281 | 869.43 | 866.14 | 3.29 | 0.0113 | 0.0339 | 929 | J281 | J282 | 30 | |
| J289 | 892.54 | 891.39 | 1.15 | 0.0113 | 0.0339 | 926 | J289 | J283 | 29.78 | |
| J283 | 889.14 | 887.99 | 1.15 | 0.0113 | 0.0339 | 925 | J283 | J277 | 29.79 | |
| J277 | 885.64 | 884.49 | 1.15 | 0.0113 | 0.0339 | 924 | J277 | J278 | 29.65 | |
| J278 | 881.48 | 880.33 | 1.15 | 0.0113 | 0.0339 | 923 | J278 | J275 | 29.69 | |
| J275 | 877.16 | 876.01 | 1.15 | 0.0113 | 0.0339 | 922 | J275 | J389 | 21.49 | |
| J389 | 873.71 | 872.56 | 1.15 | 0.0113 | 0.0339 | 921 | J389 | J388 | 20.72 | |
| J388 | 870.32 | 869.17 | 1.15 | 0.0113 | 0.0339 | 920 | J388 | J296 | 5.14 | |
| J296 | 869.9 | 868.75 | 1.15 | 0.0113 | 0.0339 | 919 | J296 | J297 | 5.23 | D 17 |
| J297 | 869.73 | 868.58 | 1.15 | 0.0113 | 0.0339 | 918 | J297 | J276 | 4.33 | DM |
| J621 | 900.16 | 899.01 | 1.15 | 0.0163 | 0.0489 | 297 | J621 | J548 | 22.18 | |
| J548 | 899.51 | 898.36 | 1.15 | 0.0113 | 0.0339 | 298 | J548 | J549 | 21.64 | |
| J549 | 898.12 | 896.97 | 1.15 | 0.0113 | 0.0339 | 299 | J549 | J554 | 29.92 | |
| J554 | 896.08 | 894.93 | 1.15 | 0.0113 | 0.0339 | 300 | J554 | J555 | 29.94 | |
| J555 | 894.2 | 893.05 | 1.15 | 0.0113 | 0.0339 | 301 | J555 | J672 | 15.37 | |
| J672 | 893.41 | 892.26 | 1.15 | 0.0113 | 0.0339 | 302 | J672 | J671 | 8.26 | |
| J671 | 893.16 | 892.01 | 1.15 | 0.0113 | 0.0339 | 303 | J671 | J552 | 8.43 | |
| J552 | 892.93 | 891.78 | 1.15 | 0.0113 | 0.0339 | 304 | J552 | J674 | 11.27 | |
| J674 | 892.37 891.2 | 891.22 890.05 | 1.15 | 0.0113 | 0.0339 | 305 | J674 | J553 | 13.21 | |
| J553 | | | 1.15 | 0.0113 | 0.0339 | 306 | J553 | J576 | 32.57 | |

| | DE | ER for 1.76 N | MLD cape | icity STP fo | r Sewerage | Network | & FSSM | at Kattapana | | |
|--------------|------------------|------------------|--------------|--------------|------------|------------|--------------|--------------|----------------|----|
| | | | | | | | | | | |
| J576 | 889.05 | 887.90 | 1.15 | 0.0113 | 0.0339 | 307 | J576 | J577 | 29.94 | |
| J577 | 887.15 | 886.00 | 1.15 | 0.0113 | 0.0339 | 308 | J577 | J574 | 29.96 | |
| J574 | 885.62 | 884.47 | 1.15 | 0.0113 | 0.0339 | 309 | J574 | J575 | 29.88 | |
| J575 | 883.39 | 882.24 | 1.15 | 0.0113 | 0.0339 | 310 | J575 | J580 | 29.74 | |
| J580 | 881.78 | 880.63 | 1.15 | 0.0163 | 0.0489 | 311 | J580 | J581 | 29.93 | |
| J581 | 880.32 | 879.17 | 1.15 | 0.0113 | 0.0339 | 312 | J581 | J673 | 16.17 | |
| J673 | 879.33 | 878.18 | 1.15 | 0.0113 | 0.0339 | 313 | J673 | J578 | 19.28 | |
| J578 | 879.22 | 878.07 | 1.15 | 0.0113 | 0.0339 | 314 | J578 | J579 | 24.08 | |
| J579 | 879.01 | 877.86 | 1.15 | 0.0113 | 0.0339 | 315 | J579 | J573 | 27.9 | |
| J573 | 879.37 | 877.70 | 1.67 | 0.0113 | 0.0339 | 316 | J573 | J668 | 12.05 | |
| J668 | 878.29 | 877.14 | 1.15 | 0.0113 | 0.0339 | 317 | J668 | J567 | 20 | |
| J567 | 879.75 | 877.02 | 2.73 | 0.0113 | 0.0339 | 318 | J567 | J568 | 29.98 | |
| J568 | 880.35 | 876.85 | 3.50 | 0.0113 | 0.0339 | 319 | J568 | J565 | 29.97 | |
| J565 | 881.61 | 876.67 | 4.94 | 0.0243 | 0.0729 | 320 | J565 | J566 | 25.33 | LS |
| J566 | 883.35 | 882.20 | 1.15 | 0.0113 | 0.0339 | 321 | J566 | J571 | 34.53 | |
| J571 | 885.28 | 882.00 | 3.28 | 0.0113 | 0.0339 | 322 | J571 | J572 | 29.37 | |
| J572 | 887.93 | 881.82 | 6.11 | 0.0113 | 0.0339 | 984 | J572 | J365 | 29.78 | |
| J365 | 884.32 | 881.65 | 2.67 | 0.0113 | 0.0339 | 985 | J365 | J364 | 29.84 | |
| J364 | 882.71 | 881.47 | 1.24 | 0.0113 | 0.0339 | 986 | J364 | J367 | 29.76 | |
| J367 | 882.3 | 881.15 | 1.15 | 0.0163 | 0.0489 | 987 | J367 | J366 | 29.98 | |
| J366 | 882.79 | 880.97 | 1.82 | 0.0113 | 0.0339 | 988 | J366 | J361 | 29.65 | LS |
| J361 | 886.73 | 885.58 | 1.15 | 0.0113 | 0.0339 | 989 | J361 | J360 | 29.57 | |
| J360 | 890.51 | 885.41 | 5.10 | 0.0113 | 0.0339 | 990 | J360 | J363 | 29.8 | |
| J363 | 891.71 | 885.23 | 6.48 | 0.0113 | 0.0339 | 991 | J363 | J362 | 29.97 | |
| J362 | 891.06 | 885.05 | 6.01 | 0.0113 | 0.0339 | 992 | J362 | J368 | 29.97 | |
| J368 | 889.88 | 884.88 | 5.00 | 0.0113 | 0.0339 | 993 | J368 | J374 | 29.85 | |
| J374 | 887 | 884.70 | 2.30 | 0.0113 | 0.0339 | 994 | J374 | J373 | 29.41 | |
| J373 | 881.07 | 879.92 | 1.15 | 0.0113 | 0.0339 | 995 | J373 | J376 | 29.38 | |
| J376 | 875.48 | 874.33 | 1.15 | 0.0113 | 0.0339 | 996 | J376 | J352 | 12.44 | |
| J644 | 901.04 | 899.89 | 1.15 | 0.0113 | 0.0339 | 366 | J644 | J620 | 15.92 | |
| J620 | 899.63 | 898.48 | 1.15 | 0.0113 | 0.0339 | 365 | J620 | J548 | 21.58 | |
| J624 | 881.97 | 880.82 | 1.15 | 0.0113 | 0.0339 | 358 | J624 | J618 | 26.05 | |
| J618 | 882.8 | 880.67 | 2.13 | 0.0113 | 0.0339 | 359 | J618 | J619 | 29.99 | |
| J619 | 881.93 | 880.49 | 1.44 | 0.0113 | 0.0339 | 360 | J619 | J616 | 29.99 | |
| J616 | 882.07 | 880.31 | 1.76 | 0.0113 | 0.0339 | 361 | J616 | J617 | 29.90 | |
| J617 | 882.1 | 880.14 | 1.96 | 0.0113 | 0.0339 | 362 | J617 | J622 | 29.99 | |
| J622 | 880.59 | 879.44 | 1.15 | 0.0113 | 0.0339 | 363 | J622 | J622 J623 | 29.98 | |
| J622 J623 | 880.39 | 879.44 879.10 | 1.15 | 0.0113 | 0.0339 | 346 | J622 | J573 | 29.98 31.59 | DM |
| J630 | 886.08 | 879.10 | 1.15 | 0.0113 | 0.0339 | 356 | J630 | J629 | 29.79 | |
| J629 | 889.81 | 884.75 | 5.06 | 0.0113 | 0.0339 | 355 | J629 | J632 | 19.69 | |
| J629 J632 | 891.25 | 884.73 884.64 | 5.00 6.61 | 0.0113 | 0.0339 | 296 | J629 J632 | J553 | 19.69 | LS |
| J356 | 891.23 884.42 | | 1.15 | 0.0113 | 0.0339 | 296 974 | J032 J356 | | 19.42 33.35 | പാ |
| | | 883.27 877.76 | | | | | | J357 | | |
| J357 | 878.91 | 877.76 | 1.15 | 0.1423 | 0.4269 | 973 072 | J357 | J345 | 29.49 | |
| J345 | 873.73 | 872.58 872.26 | 1.15 | 0.0113 | 0.0339 | 972 071 | J345 | J346 | 37.69 | |
| J346 | 875.93 | 872.36 | 3.57 | 0.0113 | 0.0339 | 971 070 | J346 | J343 | 29.97 | |
| J343 | 876.5 | 872.18 | 4.32 | 0.0113 | 0.0339 | 970 060 | J343 | J344 | 29.91 | |
| J344 | 877.03 | 872.01 | 5.02 | 0.0113 | 0.0339 | 969 | J344 | J349 | 29.95 | |

| | DI | ER for 1.76 N | ILD capa | city STP fo | r Sewerage | Networke | & FSSM a | nt Kattapana | | _ | |
|--------------|------------------|------------------|----------|-------------|------------|------------|--------------|--------------|-------|----------------|----|
| J349 | 879.34 | 871.83 | 7.51 | 0.0113 | 0.0339 | 357 | J349 | J573 | 29.16 | | |
| J379 | 900.54 | 899.39 | 1.15 | 0.0113 | 0.0339 | 951 | J379 | J380 | 34.27 | | |
| J380 | 897.73 | 896.58 | 1.15 | 0.0113 | 0.0339 | 950 | J380 | J383 | 12.04 | | |
| J383 | 895.82 | 894.67 | 1.15 | 0.0113 | 0.0339 | 949 | J383 | J377 | 17.34 | | |
| J377 | 892.73 | 891.58 | 1.15 | 0.0113 | 0.0339 | 948 | J377 | J378 | 29.52 | | |
| J378 | 888.33 | 887.18 | 1.15 | 0.0113 | 0.0339 | 2 | J378 | J308 | 29.15 | | |
| J676 | 894.93 | 893.78 | 1.15 | 0.0113 | 0.0339 | 345 | J676 | J679 | 29.91 | | |
| J679 | 895.41 | 893.60 | 1.81 | 0.0113 | 0.0339 | 344 | J679 | J678 | 29.97 | | |
| J678 | 895.76 | 893.43 | 2.33 | 0.0113 | 0.0339 | 343 | J678 | J655 | 30 | | |
| J655 | 895.94 | 893.25 | 2.69 | 0.0113 | 0.0339 | 342 | J655 | J654 | 29.84 | | |
| J654 | 896.02 | 893.08 | 2.94 | 0.0113 | 0.0339 | 341 | J654 | J657 | 29.94 | | |
| J657 | 895.65 | 892.90 | 2.75 | 0.0113 | 0.0339 | 340 | J657 | J656 | 29.99 | | |
| J656 | 895.66 | 892.72 | 2.94 | 0.0113 | 0.0339 | 339 | J656 | J651 | 29.79 | | |
| J651 | 895.67 | 892.55 | 3.12 | 0.0113 | 0.0339 | 338 | J651 | J650 | 29.83 | | |
| J650 | 897.1 | 892.37 | 4.73 | 0.0113 | 0.0339 | 337 | J650 | J653 | 29.98 | | |
| J653 | 898.08 | 892.20 | 5.88 | 0.0113 | 0.0339 | 336 | J653 | J652 | 29.95 | | |
| J652 | 897.95 | 892.02 | 5.93 | 0.0113 | 0.0339 | 335 | J652 | J291 | 13.17 | | |
| J291 | 899.29 | 891.94 | 7.35 | 0.0113 | 0.0339 | 334 | J291 | J658 | 16.79 | | |
| J658 | 897.79 | 891.84 | 5.95 | 0.0113 | 0.0339 | 333 | J658 | J664 | 30 | | |
| J664 | 897.78 | 891.67 | 6.11 | 0.0113 | 0.0339 | 332 | J664 | J663 | 30 | | |
| J663 | 897.56 | 891.49 | 6.07 | 0.0113 | 0.0339 | 331 | J663 | J666 | 29.98 | | |
| J666 | 897.38 | 891.31 | 6.07 | 0.0113 | 0.0339 | 330 | J666 | J665 | 29.98 | | |
| J665 | 896.59 | 891.14 | 5.45 | 0.0113 | 0.0339 | 329 | J665 | J660 | 29.93 | | |
| J660 | 894.78 | 890.96 | 3.82 | 0.0113 | 0.0339 | 328 | J660 | J667 | 29.96 | | |
| J667 | 893.4 | 890.79 | 2.61 | 0.0113 | 0.0339 | 327 | J667 | J662 | 20.74 | | |
| J662 | 892.88 | 890.66 | 2.22 | 0.0113 | 0.0339 | 326 | J662 | J661 | 29.91 | | |
| J661 | 891.76 | 890.49 | 1.27 | 0.0113 | 0.0339 | 325 | J661 | J570 | 29.96 | | |
| J570 | 890.18 | 889.03 | 1.15 | 0.0113 | 0.0489 | 324 | J570 | J569 | 29.90 | | |
| J569 | 888.52 | 887.37 | 1.15 | 0.0113 | 0.0339 | 323 | J569 | J572 | 30.53 | DM Busstand | ro |
| J193 | 976.93 | 975.78 | 1.15 | 0.0113 | 0.0339 | 259 | J193 | J200 | 19.66 | KSEB Jn | 10 |
| J200 | 971.33 | 970.18 | 1.15 | 0.0113 | 0.0339 | 258 | J200 | J207 | 29.66 | | |
| J207 | 975.81 | 970.01 | 5.80 | 0.0113 | 0.0339 | 257 | J207 | J206 | 29.69 | LS | |
| J206 | 979.57 | 978.42 | 1.15 | 0.0113 | 0.0339 | 256 | J206 | J208 | 29.78 | | |
| J208 | 981.87 | 978.24 | 3.63 | 0.0113 | 0.0339 | 255 | J208 | J210 | 29.92 | | |
| J210 | 983.57 | 978.07 | 5.50 | 0.0113 | 0.0339 | 254 | J210 | J209 | 29.54 | | |
| J209 | 982.99 | 977.90 | 5.09 | 0.0113 | 0.0339 | 253 | J209 | J202 | 27.53 | | |
| J202 | 980.46 | 977.73 | 2.73 | 0.0113 | 0.0339 | 252 | J202 | J201 | 31.98 | | |
| J202 | 977.17 | 976.02 | 1.15 | 0.0113 | 0.0339 | 252 | J202 | J201 J203 | 40.67 | | |
| J203 | 976.26 | 975.11 | 1.15 | 0.0113 | 0.0339 | 250 | J201 | J205 | 19.09 | | |
| J205 J205 | 976.9 | 975.00 | 1.90 | 0.0113 | 0.0339 | 230 249 | J205 | J203 J204 | 29.87 | | |
| J205 J204 | 976.93 | 974.82 | 2.11 | 0.0113 | 0.0339 | 248 | J205 | J175 | 29.96 | | |
| J175 | 975.81 | 974.65 | 1.16 | 0.0113 | 0.0339 | 240 | J175 | J175 J174 | 29.95 | | |
| J174 | 974.63 | 973.48 | 1.10 | 0.0113 | 0.0339 | 246 | J175 J174 | J309 | 16.87 | | |
| J309 | 974.03 973.13 | 973.48 971.98 | 1.15 | 0.0113 | 0.0339 | 240 | J309 | J309 J176 | 19.42 | | |
| J176 | 973.13 969.96 | 971.98 968.81 | 1.15 | 0.0113 | 0.0339 | 243 244 | J176 | J178 | 22.88 | | |
| J178 J178 | 969.96 967.92 | 968.81 966.77 | 1.15 | 0.0113 | 0.0339 | 244 243 | J178 J178 | J178 J177 | 22.88 | | |

| | DI | ER for 1.76 N | ILD capa | city STP fo | r Sewerage | Network | & FSSM a | t Kattapana | | |
|------|------------------|---------------|----------|-------------|------------|---------|--------------|-------------|-------|----|
| 1177 | 0((21 | 065.06 | 1 15 | 0.0112 | 0.0220 | 242 | 1177 | 1170 | 20.74 | |
| J177 | 966.21 | 965.06 | 1.15 | 0.0113 | 0.0339 | 242 | J177 | J170 | 29.74 | |
| J170 | 962.27 | 961.12 | 1.15 | 0.0113 | 0.0339 | 241 | J170 | J169 | 29.81 | |
| J169 | 958.95 | 957.80 | 1.15 | 0.0113 | 0.0339 | 240 | J169 | J171 | 29.74 | |
| J171 | 955.19 | 954.04 | 1.15 | 0.0113 | 0.0339 | 239 | J171 J196 | J196 | 14.78 | |
| J196 | 952 040 26 | 950.85 | 1.15 | 0.0113 | 0.0339 | 238 | | J173 | 14.54 | |
| J173 | 949.36 047.26 | 948.21 | 1.15 | 0.0113 | 0.0339 | 237 | J173 | J172 | 29.9 | |
| J172 | 947.36 | 946.21 | 1.15 | 0.0113 | 0.0339 | 236 | J172 | J179 | 29.96 | |
| J179 | 947.02 | 945.87 | 1.15 | 0.0113 | 0.0339 | 235 | J179 | J186 | 29.87 | |
| J186 | 947.66 | 945.69 | 1.97 | 0.0113 | 0.0339 | 234 | J186 | J185 | 29.89 | |
| J185 | 945.68 | 944.53 | 1.15 | 0.0113 | 0.0339 | 233 | J185 | J189 | 29.63 | |
| J189 | 941 | 939.85 | 1.15 | 0.0113 | 0.0339 | 231 | J189 | J337 | 14.7 | |
| J337 | 939.2 | 938.05 | 1.15 | 0.0113 | 0.0339 | 230 | J337 | J188 | 15.61 | |
| J188 | 937.08 | 935.93 | 1.15 | 0.0113 | 0.0339 | 229 | J188 | J181 | 30 | |
| J181 | 936.82 | 935.67 | 1.15 | 0.0113 | 0.0339 | 228 | J181 | J180 | 29.38 | |
| J180 | 939.23 | 935.50 | 3.73 | 0.0113 | 0.0339 | 227 | J180 | J182 | 34.69 | |
| J182 | 939.36 | 935.29 | 4.07 | 0.0113 | 0.0339 | 226 | J182 | J184 | 24.82 | |
| J184 | 937.38 | 935.15 | 2.23 | 0.0113 | 0.0339 | 225 | J184 | J183 | 29.69 | |
| J183 | 933.22 | 932.07 | 1.15 | 0.0113 | 0.0339 | 224 | J183 | J238 | 29.68 | |
| J238 | 928.82 | 927.67 | 1.15 | 0.0113 | 0.0339 | 223 | J238 | J237 | 29.72 | |
| J237 | 926.23 | 925.08 | 1.15 | 0.0113 | 0.0339 | 222 | J237 | J239 | 29.92 | |
| J239 | 924.82 | 923.67 | 1.15 | 0.0113 | 0.0339 | 221 | J239 | J241 | 29.6 | |
| J241 | 920.5 | 919.35 | 1.15 | 0.0113 | 0.0339 | 220 | J241 | J240 | 33.58 | |
| J240 | 916.94 | 915.79 | 1.15 | 0.0113 | 0.0339 | 219 | J240 | J233 | 38.35 | |
| J233 | 915.81 | 914.66 | 1.15 | 0.0113 | 0.0339 | 218 | J233 | J232 | 17.76 | |
| J232 | 914.12 | 912.97 | 1.15 | 0.0113 | 0.0339 | 217 | J232 | J234 | 29.26 | |
| J234 | 911.27 | 910.12 | 1.15 | 0.0113 | 0.0339 | 216 | J234 | J236 | 34.51 | |
| J236 | 908.02 | 906.87 | 1.15 | 0.0113 | 0.0339 | 215 | J236 | J195 | 19.52 | |
| J195 | 906.98 | 905.83 | 1.15 | 0.0113 | 0.0339 | 214 | J195 | J197 | 9.19 | |
| J197 | 905.66 | 904.51 | 1.15 | 0.0113 | 0.0339 | 213 | J197 | J199 | 9.54 | |
| J199 | 903.92 | 902.77 | 1.15 | 0.0113 | 0.0339 | 212 | J199 | J644 | 30 | DI |
| | | | | 2.5746 | 7.7238 | | | | | - |

<u>Kattapana Network-Well zone -5</u>

[NODE]

[CONDUITS]

| Node ID | Ground Elevation | Invert Elevation | Depth of Cut | DWF (LPS) | Peak Flow (LPS) | Conduit ID | From Node | To Node | Length |
|------------|---------------------|---------------------|-----------------|--------------|-----------------------|---------------|--------------|---------|--------|
| J151 | 873.71 | 872.56 | 1.15 | 0.2713 | 0.8139 | 368 | J151 | J154 | 29.98 |
| J154 | 873.2 | 872.05 | 1.15 | 0.0113 | 0.0339 | 369 | J154 | J153 | 30 |
| J153 | 872.9 | 871.75 | 1.15 | 0.0113 | 0.0339 | 370 | J153 | J148 | 29.99 |
| J148 | 872.48 | 871.33 | 1.15 | 0.0113 | 0.0339 | 371 | J148 | J147 | 29.89 |
| J147 | 871.28 | 870.13 | 1.15 | 0.0113 | 0.0339 | 372 | J147 | J150 | 29.94 |
| J150 | 869.96 | 868.81 | 1.15 | 0.0113 | 0.0339 | 373 | J150 | J149 | 29.92 |
| J149 | 868.48 | 867.33 | 1.15 | 0.0113 | 0.0339 | 374 | J149 | J194 | 29.91 |
| J194 | 866.77 | 865.62 | 1.15 | 0.0113 | 0.0339 | 375 | J194 | J193 | 29.88 |

Kerala Water Authority, Sewerage Circle, Kochi

| | DE | ER for 1.76 N | 1LD cape | acity STP fo | r Sewerage | Networke | & FSSM a | t Kattapana | | |
|-------|--------|---------------|----------|--------------|------------|----------|----------|-------------|-------|----|
| J193 | 864.48 | 863.33 | 1.15 | 0.0113 | 0.0339 | 376 | J193 | J196 | 29.76 | |
| J196 | 860.7 | 859.55 | 1.15 | 0.0113 | 0.0339 | 377 | J196 | J195 | 29.67 | |
| J195 | 856.98 | 855.83 | 1.15 | 0.0113 | 0.0339 | 378 | J195 | J190 | 19.49 | |
| J190 | 854.98 | 853.83 | 1.15 | 0.0113 | 0.0339 | 379 | J190 | J895 | 17.87 | |
| J895 | 853.91 | 852.76 | 1.15 | 0.0113 | 0.0339 | 401 | J895 | J894 | 39.31 | |
| J894 | 853.39 | 852.24 | 1.15 | 0.0113 | 0.0339 | 400 | J894 | J897 | 29.99 | |
| J897 | 853.11 | 851.96 | 1.15 | 0.0113 | 0.0339 | 399 | J897 | J896 | 29.98 | |
| J896 | 852.96 | 851.78 | 1.18 | 0.0113 | 0.0339 | 398 | J896 | J891 | 29.76 | |
| J891 | 853.36 | 851.61 | 1.75 | 0.0113 | 0.0339 | 397 | J891 | J890 | 29.91 | |
| J890 | 855.56 | 851.43 | 4.13 | 0.0113 | 0.0339 | 396 | J890 | J893 | 29.91 | |
| J893 | 855.72 | 851.26 | 4.46 | 0.0113 | 0.0339 | 395 | J893 | J892 | 29.98 | |
| J892 | 855.45 | 851.08 | 4.37 | 0.4913 | 1.4739 | 394 | J892 | J898 | 29.85 | |
| J898 | 858.06 | 850.90 | 7.16 | 0.0113 | 0.0339 | 393 | J898 | J904 | 29.98 | |
| J904 | 857.86 | 850.73 | 7.13 | 0.0113 | 0.0339 | 392 | J904 | J903 | 29.64 | |
| J903 | 855.47 | 850.55 | 4.92 | 0.0113 | 0.0339 | 391 | J903 | J906 | 29.96 | |
| J906 | 854.18 | 850.38 | 3.80 | 0.0113 | 0.0339 | 390 | J906 | J905 | 22.06 | |
| J905 | 853.94 | 850.25 | 3.69 | 0.0213 | 0.0639 | 37 | J905 | J900 | 35.28 | |
| J900 | 853.87 | 850.04 | 3.83 | 0.0113 | 0.0339 | 38 | J900 | J899 | 32.42 | |
| J899 | 853.94 | 849.85 | 4.09 | 0.0113 | 0.0339 | 39 | J899 | J902 | 29.85 | |
| J902 | 851.81 | 849.67 | 2.14 | 0.0113 | 0.0339 | 40 | J902 | J901 | 29.74 | |
| J901 | 848.43 | 847.28 | 1.15 | 0.0113 | 0.0339 | 41 | J901 | J946 | 29.87 | |
| J946 | 845.73 | 844.58 | 1.15 | 0.0113 | 0.0339 | 42 | J946 | J945 | 29.65 | |
| J945 | 841.2 | 840.05 | 1.15 | 0.0113 | 0.0339 | 43 | J945 | J948 | 29.65 | |
| J948 | 836.65 | 835.50 | 1.15 | 0.0113 | 0.0339 | 44 | J948 | J947 | 29.85 | |
| J947 | 835.29 | 834.14 | 1.15 | 0.0113 | 0.0339 | 45 | J947 | J942 | 29.93 | |
| J942 | 834.9 | 833.75 | 1.15 | 0.0113 | 0.0339 | 46 | J942 | J919 | 14.47 | |
| J919 | 835.18 | 833.66 | 1.52 | 0.0113 | 0.0339 | 47 | J919 | J941 | 15.2 | |
| J941 | 837.42 | 833.58 | 3.84 | 0.0113 | 0.0339 | 48 | J941 | J944 | 23.52 | LS |
| J944 | 840.2 | 839.05 | 1.15 | 0.0113 | 0.0339 | 49 | J944 | J943 | 34.53 | |
| J943 | 842.29 | 838.85 | 3.44 | 0.0113 | 0.0339 | 50 | J943 | J949 | 29.79 | |
| J949 | 840.95 | 838.67 | 2.28 | 0.0113 | 0.0339 | 51 | J949 | J955 | 29.84 | |
| J955 | 839.88 | 838.50 | 1.38 | 0.0113 | 0.0339 | 52 | J955 | J954 | 29.87 | |
| J954 | 837.94 | 836.79 | 1.15 | 0.0113 | 0.0339 | 53 | J954 | J957 | 29.86 | |
| J957 | 837.18 | 836.03 | 1.15 | 0.0113 | 0.0339 | 54 | J957 | J956 | 29.83 | |
| J956 | 836.02 | 834.87 | 1.15 | 0.0113 | 0.0339 | 55 | J956 | J951 | 21.37 | |
| J951 | 836.9 | 834.74 | 2.16 | 0.0113 | 0.0339 | 56 | J951 | J918 | 18.64 | |
| J918 | 837.56 | 834.63 | 2.93 | 0.0113 | 0.0339 | 57 | J918 | J1061 | 19.92 | |
| J1061 | 837.8 | 834.52 | 3.28 | 0.0113 | 0.0339 | 63 | J1061 | J1064 | 28.76 | |
| J1064 | 833.4 | 832.25 | 1.15 | 0.0113 | 0.0339 | 64 | J1064 | J1063 | 29.72 | |
| J1063 | 828.86 | 827.71 | 1.15 | 0.0113 | 0.0339 | 65 | J1063 | J1069 | 29.54 | |
| J1069 | 825.58 | 824.43 | 1.15 | 0.0113 | 0.0339 | 66 | J1069 | J1075 | 33.34 | |
| J1075 | 824.06 | 822.91 | 1.15 | 0.0113 | 0.0339 | 67 | J1075 | J1074 | 23.09 | |
| J1074 | 823.3 | 822.15 | 1.15 | 0.0113 | 0.0339 | 68 | J1074 | J1090 | 15.69 | |
| J1090 | 822.56 | 821.41 | 1.15 | 0.0113 | 0.0339 | 69 | J1090 | J1077 | 15.28 | |
| J1077 | 822.74 | 821.32 | 1.42 | 0.0113 | 0.0339 | 70 | J1077 | J1076 | 31.29 | |
| J1076 | 823.34 | 821.14 | 2.20 | 0.0113 | 0.0339 | 71 | J1076 | J1071 | 29.7 | |
| J1071 | 823.71 | 820.96 | 2.75 | 0.0113 | 0.0339 | 72 | J1071 | J1070 | 29.53 | |

| | D | ER for 1.76 N | 1LD cape | acity STP fo | r Sewerage | e Networke | & FSSM a | t Kattapana | | |
|-------|--------|---------------|----------|--------------|------------|------------|----------|-------------|-------|------|
| | | | | | | | | | | |
| J1070 | 826.99 | 820.79 | 6.20 | 0.0113 | 0.0339 | 73 | J1070 | J1073 | 29.82 | |
| J1073 | 824.05 | 820.61 | 3.44 | 0.0113 | 0.0339 | 74 | J1073 | J1072 | 23.7 | |
| J1072 | 822.65 | 820.47 | 2.18 | 0.0113 | 0.0339 | 75 | J1072 | J981 | 28 | |
| J981 | 822.23 | 820.31 | 1.92 | 0.0113 | 0.0339 | 76 | J981 | J980 | 31.93 | |
| J980 | 822.71 | 820.12 | 2.59 | 0.0113 | 0.0339 | 77 | J980 | J983 | 36.18 | |
| J983 | 822.9 | 819.91 | 2.99 | 0.0113 | 0.0339 | 78 | J983 | J982 | 29.99 | |
| J982 | 823.14 | 819.73 | 3.41 | 0.0113 | 0.0339 | 79 | J982 | J977 | 29.85 | |
| J977 | 825.84 | 819.56 | 6.28 | 0.0113 | 0.0339 | 1 | J977 | OUTFALL | 29.65 | WELL |
| J1065 | 853.47 | 852.32 | 1.15 | 0.0113 | 0.0339 | 62 | J1065 | J1087 | 19.95 | |
| J1087 | 852.09 | 850.94 | 1.15 | 0.0113 | 0.0339 | 61 | J1087 | J1068 | 23.04 | |
| J1068 | 850.21 | 849.06 | 1.15 | 0.0113 | 0.0339 | 60 | J1068 | J1067 | 34.22 | |
| J1067 | 846.61 | 845.46 | 1.15 | 0.0113 | 0.0339 | 59 | J1067 | J1062 | 29.59 | |
| J1062 | 842.48 | 841.33 | 1.15 | 0.0113 | 0.0339 | 58 | J1062 | J1061 | 30.51 | DM |
| J740 | 887.79 | 886.64 | 1.15 | 0.0113 | 0.0339 | 141 | J740 | J741 | 29.95 | |
| J741 | 886.57 | 885.42 | 1.15 | 0.0113 | 0.0339 | 142 | J741 | J696 | 29.92 | |
| J696 | 884.8 | 883.65 | 1.15 | 0.0113 | 0.0339 | 143 | J696 | J697 | 29.95 | |
| J697 | 883.05 | 881.90 | 1.15 | 0.0113 | 0.0339 | 144 | J697 | J694 | 29.91 | |
| J694 | 880.72 | 879.57 | 1.15 | 0.0113 | 0.0339 | 145 | J694 | J695 | 29.95 | |
| J695 | 879.13 | 877.98 | 1.15 | 0.0113 | 0.0339 | 146 | J695 | J700 | 29.96 | |
| J700 | 877.7 | 876.55 | 1.15 | 0.0113 | 0.0339 | 147 | J700 | J701 | 29.97 | |
| J701 | 876.41 | 875.26 | 1.15 | 0.0113 | 0.0339 | 148 | J701 | J698 | 29.94 | |
| J698 | 874.79 | 873.64 | 1.15 | 0.0113 | 0.0339 | 149 | J698 | J699 | 29.46 | |
| J699 | 873.62 | 872.47 | 1.15 | 0.0113 | 0.0339 | 150 | J699 | J693 | 29.95 | |
| J693 | 872.55 | 871.40 | 1.15 | 0.0113 | 0.0339 | 151 | J693 | J687 | 29.95 | |
| J687 | 870.96 | 869.81 | 1.15 | 0.0113 | 0.0339 | 152 | J687 | J688 | 29.95 | |
| J688 | 869.21 | 868.06 | 1.15 | 0.0113 | 0.0339 | 153 | J688 | J685 | 29.94 | |
| J685 | 867.29 | 866.14 | 1.15 | 0.0113 | 0.0339 | 154 | J685 | J686 | 33.55 | |
| J686 | 864.76 | 863.61 | 1.15 | 0.0113 | 0.0339 | 155 | J686 | J583 | 7.98 | |
| J583 | 864.76 | 863.56 | 1.20 | 0.0113 | 0.0339 | 156 | J583 | J691 | 23.21 | |
| J691 | 863.17 | 862.02 | 1.15 | 0.0113 | 0.0339 | 157 | J691 | J692 | 25.08 | |
| J692 | 863.1 | 861.87 | 1.23 | 0.0113 | 0.0339 | 158 | J692 | J689 | 29.99 | |
| J689 | 863.59 | 861.70 | 1.89 | 0.0113 | 0.0339 | 159 | J689 | J582 | 15.53 | |
| J582 | 864.2 | 861.60 | 2.60 | 0.0113 | 0.0339 | 160 | J582 | J690 | 14.41 | |
| J690 | 865.41 | 861.52 | 3.89 | 0.0113 | 0.0339 | 161 | J690 | J713 | 29.89 | LS |
| J713 | 867.92 | 866.77 | 1.15 | 0.0113 | 0.0339 | 162 | J713 | J714 | 29.9 | |
| J714 | 870.27 | 866.59 | 3.68 | 0.0113 | 0.0339 | 163 | J714 | J711 | 29.9 | LS |
| J711 | 872.48 | 871.33 | 1.15 | 0.0113 | 0.0339 | 164 | J711 | J712 | 29.94 | |
| J712 | 874.34 | 871.15 | 3.19 | 0.0113 | 0.0339 | 165 | J712 | J717 | 29.91 | |
| J717 | 876.27 | 870.98 | 5.29 | 0.0113 | 0.0339 | 166 | J717 | J588 | 15.4 | |
| J588 | 876.77 | 870.89 | 5.88 | 0.0113 | 0.0339 | 389 | J588 | J1004 | 29.94 | |
| J1004 | 875.28 | 870.71 | 4.57 | 0.0113 | 0.0339 | 521 | J1004 | J821 | 29.95 | |
| J821 | 873.61 | 870.54 | 3.07 | 0.0113 | 0.0339 | 522 | J821 | J638 | 29.95 | |
| J638 | 871.97 | 870.36 | 1.61 | 0.0113 | 0.0339 | 523 | J638 | J637 | 30 | |
| J637 | 871.53 | 870.18 | 1.35 | 0.0113 | 0.0339 | 524 | J637 | J640 | 30 | |
| J640 | 871.08 | 869.93 | 1.15 | 0.0113 | 0.0339 | 525 | J640 | J639 | 30 | |
| J639 | 870.64 | 869.49 | 1.15 | 0.0113 | 0.0339 | 526 | J639 | J634 | 30 | |
| J634 | 870.2 | 869.05 | 1.15 | 0.0113 | 0.0339 | 527 | J634 | J633 | 29.98 | |
| _ | | | | | | | | | | |

| | DE | ER for 1.76 N | ALD cap | acity STP fo | or Sewerage | Networke | & FSSM at | Kattapana | | |
|---------------|--------|------------------|--------------|------------------|------------------|----------|---------------|---------------|----------------|----|
| J633 | 869.71 | 868.56 | 1.15 | 0.0113 | 0.0339 | 528 | J633 | J636 | 29.95 | |
| J636 | 868.03 | 866.88 | 1.15 | 0.0113 | 0.0339 | 529 | J636 | J635 | 25.38 | |
| J635 | 866.6 | 865.45 | 1.15 | 0.0113 | 0.0339 | 530 | J635 | J1002 | 16.86 | |
| J1002 | 863.75 | 862.60 | 1.15 | 0.0113 | 0.0339 | 531 | J1002 | J641 | 17.6 | |
| J641 | 863.76 | 862.50 | 1.26 | 0.0113 | 0.0339 | 564 | J641 | J647 | 29.68 | |
| J647 | 859.5 | 858.35 | 1.15 | 0.0113 | 0.0339 | 565 | J647 | J1005 | 12.74 | |
| J1005 | 857.52 | 856.37 | 1.15 | 0.0113 | 0.0339 | 566 | J1005 | J1003 | 8.33 | |
| J1003 | 855.8 | 854.65 | 1.15 | 0.0113 | 0.0339 | 567 | J1003 | J646 | 8.42 | |
| J646 | 854.2 | 853.05 | 1.15 | 0.0113 | 0.0339 | 568 | J646 | J649 | 29.36 | |
| J649 | 848.04 | 846.89 | 1.15 | 0.0113 | 0.0339 | 569 | J649 | J648 | 29.36 | |
| J648 | 841.89 | 840.74 | 1.15 | 0.0113 | 0.0339 | 570 | J648 | J1008 | 19.79 | |
| J1008 | 838.98 | 837.83 | 1.15 | 0.0113 | 0.0339 | 571 | J1008 | J643 | 21.95 | |
| J643 | 835.77 | 834.62 | 1.15 | 0.0113 | 0.0339 | 572 | J643 | J642 | 22.92 | |
| J642 | 836.95 | 834.49 | 2.46 | 0.0113 | 0.0339 | 573 | J642 | J645 | 22.63 | |
| J645 | 838.11 | 834.35 | 3.76 | 0.0113 | 0.0339 | 574 | J645 | J1009 | 18.17 | |
| J1009 | 840.05 | 834.25 | 5.80 | 0.0113 | 0.0339 | 107 | J1009 | J987 | 23.57 | |
| J987 | 835.88 | 834.11 | 1.77 | 0.0113 | 0.0339 | 107 | J987 | J971 | 31.66 | |
| J971 | 835.88 | 833.92 | 3.62 | 0.0113 | 0.0339 | 100 | J987 J971 | J988 | 20.99 | |
| J971 J988 | 836.95 | 833.80 | 3.15 | 0.0113 | 0.0339 | 90 | J988 | J1066 | 23.73 | |
| J1066 | 836.53 | 833.66 | 2.87 | 0.0113 | 0.0339 | 90 89 | J1066 | J991 | 18.39 | |
| J1000 J991 | 836.42 | 833.55 | 2.87 | 0.0113 | 0.0339 | 88 | J991 | J991 J992 | 29.4 | |
| J991 J992 | 830.42 | 833.38 | 3.64 | 0.0113 | 0.0339 | 80 87 | J991 J992 | J992 J989 | 29.4 | |
| J992 J989 | 837.62 | 833.24 | 4.38 | 0.0113 | 0.0339 | 87 86 | J992 J989 | J989 J990 | 33.01 | |
| J989 J990 | 837.02 | 833.04 | 4.38 5.01 | 0.0113 | 0.0339 | 80 85 | J989 J990 | J990 J1089 | 19.86 | |
| J990 J1089 | 838.03 | 833.04 | 4.98 | 0.0113 | 0.0339 | 83 84 | J990 J1089 | J1089 J984 | 20.84 | |
| J984 | 837.38 | 832.93 832.80 | 4.98 | 0.0113 | 0.0339 | 83 | J984 | J984 J978 | 20.84 | |
| | | | | | | | | | | |
| J978 | 836.81 | 832.67 832.50 | 4.14 | 0.0113 0.0113 | 0.0339 0.0339 | 82 81 | J978 | J979 | 29.61 29.7 | |
| J979 | 834.56 | | 2.06 | | | 81 80 | J979 | J976 | | DМ |
| J976 | 830.37 | 829.22 | 1.15 | 0.0113 0.0113 | 0.0339 | 80 | J976 | J977 | 29.66 25.25 | DM |
| J729 | 868.64 | 867.49 | 1.15 | | 0.0339 | 547 | J729 | J728 | 25.35 | |
| J728 | 873.21 | 867.34 | 5.87 | 0.0113 | 0.0339 | 546 | J728 | J731 | 34.22 | |
| J731 | 872.05 | 867.14 | 4.91 | 0.0113 | 0.0339 | 545 | J731 | J749 | 20.03 | |
| J749 | 871.3 | 867.02 | 4.28 | 0.0113 | 0.0339 | 544 | J749 | J725 | 22.03 | |
| J725 | 870.62 | 866.89 | 3.73 | 0.0113 | 0.0339 | 543 | J725 | J752 | 24.31 | |
| J752 | 868.2 | 866.75 | 1.45 | 0.0113 | 0.0339 | 542 | J752 | J730 | 23.49 | |
| J730 | 867.3 | 866.15 | 1.15 | 0.0113 | 0.0339 | 541 | J730 | J720 | 18.54 | |
| J720 | 866.01 | 864.86 | 1.15 | 0.0113 | 0.0339 | 540 | J720 | J583 | 11.35 | |
| J743 | 874.13 | 872.98 | 1.15 | 0.0113 | 0.0339 | 539 | J743 | J750 | 27.55 | |
| J750 | 870.22 | 869.07 | 1.15 | 0.0113 | 0.0339 | 538 | J750 | J744 | 25.3 | |
| J744 | 870.22 | 868.92 | 1.30 | 0.0113 | 0.0339 | 537 | J744 | J738 | 30 | |
| J738 | 870.22 | 868.74 | 1.48 | 0.0113 | 0.0339 | 536 | J738 | J739 | 30 | |
| J739 | 870.22 | 868.57 | 1.65 | 0.0113 | 0.0339 | 535 | J739 | J736 | 31.93 | |
| J736 | 870.22 | 868.38 | 1.84 | 0.0113 | 0.0339 | 534 | J736 | J742 | 24.4 | |
| J742 | 868.4 | 867.25 | 1.15 | 0.0113 | 0.0339 | 533 | J742 | J737 | 23.7 | |
| J737 | 870.22 | 867.11 | 3.11 | 0.0113 | 0.0339 | 532 | J737 | J582 | 9.97 | DM |
| J964 | 869.55 | 868.40 | 1.15 | 0.1013 | 0.3039 | 128 | J964 | J997 | 20.13 | |
| J997 | 868.39 | 867.24 | 1.15 | 0.0113 | 0.0339 | 127 | J997 | J998 | 29.14 | |

| | DE | ER for 1.76 I | MLD cap | acity STP fo | r Sewerage | Networko | & FSSM a | tt Kattapana | | |
|----------------|------------------|------------------|---------|------------------|------------------|----------|----------------|----------------|----------|----|
| J998 | 866 | 864.85 | 1.15 | 0.0113 | 0.0339 | 126 | J998 | J1021 | 30.55 | |
| J1021 | 863.32 | 862.17 | 1.15 | 0.0113 | 0.0339 | 120 | J1021 | J1021 | 29.84 | |
| J1021 | 860.24 | 859.09 | 1.15 | 0.0113 | 0.0339 | 123 | J1021 | J1022 | 29.83 | |
| J1022 | 857.26 | 856.11 | 1.15 | 0.0113 | 0.0339 | 121 | J1019 | J1019 | 29.83 | |
| J1019 | 854.14 | 852.99 | 1.15 | 0.0113 | 0.0339 | 123 | J1019 | J1025 | 29.83 | |
| J1020 | 850.85 | 849.70 | 1.15 | 0.0113 | 0.0339 | 122 | J1025 | J1025 | 26.71 | |
| J1025 | 847.52 | 846.37 | 1.15 | 0.0113 | 0.0339 | 121 | J1025 | J1020 | 32.67 | |
| J1020 | 845.78 | 844.63 | 1.15 | 0.0113 | 0.0339 | 119 | J1020 | J1023 | 29.98 | |
| J1025 | 845.26 | 844.11 | 1.15 | 0.0113 | 0.0339 | 118 | J1023 | J1024 J1018 | 29.95 | |
| J1024 | 845.35 | 843.93 | 1.42 | 0.0113 | 0.0339 | 117 | J1018 | J1010 | 30 | |
| J1010 | 845.17 | 843.76 | 1.41 | 0.0113 | 0.0339 | 117 | J1010 | J1012 J1013 | 30 30 | |
| J1012 | 844.89 | 843.58 | 1.31 | 0.0113 | 0.0339 | 115 | J1012 | J1019 | 29.99 | |
| J1015 | 844.99 | 843.40 | 1.51 | 0.0113 | 0.0339 | 113 | J1015 | J1010 | 29.99 | |
| J1010 | 845.27 | 843.23 | 2.04 | 0.0113 | 0.0339 | 114 | J1010 | J1011 | 29.97 | |
| J1011 | 845.72 | 843.23 843.10 | 2.64 | 0.0113 | 0.0339 | 113 | J1011 | J1010 J1017 | 38.83 | |
| J1010 J1017 | 843.72 847.46 | 843.10 842.88 | 4.58 | 0.0113 | 0.0339 | 112 | J1010 J1017 | J1017 J1014 | 29.98 | |
| | | | | | | 111 | J1017 J1014 | | 29.98 | |
| J1014 | 847.47 | 842.70 | 4.77 | 0.0113 0.0113 | 0.0339 0.0339 | | | J1015 | 29.7 | |
| J1015 | 846.27 | 842.52 | 3.75 | | | 109 | J1015 | J970 | | DM |
| J970 | 843.77 | 842.35 | 1.42 | 0.0113 | 0.0339 | 108 | J970 | J1009 | 21.45 | DM |
| J198 | 908.69 | 907.54 | 1.15 | 0.0113 | 0.0339 | 3 | J198 | J180 | 9.78 | |
| J180 | 908.42 | 907.27 | 1.15 | 0.0113 | 0.0339 | 4 | J180 | J174 | 29.91 | |
| J174 | 907 | 905.85 | 1.15 | 0.0113 | 0.0339 | 5 | J174 | J175 | 29.99 | |
| J175 | 906.72 | 905.57 | 1.15 | 0.0113 | 0.0339 | 6 | J175 | J172 | 29.84 | |
| J172 | 904.69 | 903.54 | 1.15 | 0.0113 | 0.0339 | 7 | J172 | J173 | 29.79 | |
| J173 | 901.35 | 900.20 | 1.15 | 0.0113 | 0.0339 | 8 | J173 | J178 | 29.68 | |
| J178 | 897.21 | 896.06 | 1.15 | 0.0113 | 0.0339 | 9 | J178 | J179 | 29.89 | |
| J179 | 894.65 | 893.50 | 1.15 | 0.0113 | 0.0339 | 10 | J179 | J176 | 29.73 | |
| J176 | 891.3 | 890.15 | 1.15 | 0.0113 | 0.0339 | 11 | J176 | J177 | 34.62 | |
| J177 | 886.04 | 884.89 | 1.15 | 0.0113 | 0.0339 | 12 | J177 | J185 | 4.88 | |
| J185 | 876.92 | 875.77 | 1.15 | 0.0113 | 0.0339 | 15 | J185 | J912 | 24.7 | |
| J912 | 876.92 | 875.62 | 1.30 | 0.0113 | 0.0339 | 16 | J912 | J911 | 29.98 | |
| J911 | 876.92 | 875.45 | 1.47 | 0.0113 | 0.0339 | 17 | J911 | J188 | 16.94 | |
| J188 | 876.92 | 875.35 | 1.57 | 0.0113 | 0.0339 | 18 | J188 | J914 | 12.88 | |
| J914 | 876.91 | 875.27 | 1.64 | 0.0113 | 0.0339 | 19 | J914 | J187 | 14.08 | |
| J187 | 876.72 | 875.19 | 1.53 | 0.0113 | 0.0339 | 20 | J187 | J913 | 15.73 | |
| J913 | 877.91 | 875.10 | 2.81 | 0.0113 | 0.0339 | 21 | J913 | J182 | 19.93 | |
| J182 | 876.44 | 874.98 | 1.46 | 0.0113 | 0.0339 | 22 | J182 | J908 | 22.97 | |
| J908 | 874.17 | 873.02 | 1.15 | 0.0113 | 0.0339 | 23 | J908 | J907 | 16.57 | |
| J907 | 874.62 | 872.92 | 1.70 | 0.0113 | 0.0339 | 24 | J907 | J910 | 29.63 | |
| J910 | 875.09 | 872.75 | 2.34 | 0.0113 | 0.0339 | 25 | J910 | J181 | 16.85 | |
| J181 | 873.91 | 872.65 | 1.26 | 0.0113 | 0.0339 | 26 | J181 | J909 | 12.95 | |
| J909 | 873.07 | 871.92 | 1.15 | 0.0113 | 0.0339 | 27 | J909 | J915 | 29.96 | |
| J915 | 872.84 | 871.69 | 1.15 | 0.0113 | 0.0339 | 28 | J915 | J921 | 29.99 | |
| J921 | 872.77 | 871.51 | 1.26 | 0.0113 | 0.0339 | 29 | J921 | J184 | 21.53 | |
| J184 | 870.75 | 869.60 | 1.15 | 0.0113 | 0.0339 | 30 | J184 | J920 | 7.33 | |
| J920 | 870.55 | 869.40 | 1.15 | 0.0113 | 0.0339 | 31 | J920 | J183 | 7.71 | |
| J183 | 870.21 | 869.06 | 1.15 | 0.0113 | 0.0339 | 32 | J183 | J923 | 22 | |

| J923 | 868.89 | 867.74 | 1.15 | 0.0113 | 0.0339 | 33 | J923 | J922 | 29.9 | |
|------|--------|--------|------|--------|--------|-----|------|------|-------|----|
| J922 | 868.03 | 866.88 | 1.15 | 0.0113 | 0.0339 | 34 | J922 | J917 | 29.85 | |
| J917 | 865.45 | 864.30 | 1.15 | 0.0113 | 0.0339 | 35 | J917 | J916 | 29.2 | |
| J916 | 860.33 | 859.18 | 1.15 | 0.0113 | 0.0339 | 36 | J916 | J905 | 29.31 | DN |
| J201 | 885.65 | 884.50 | 1.15 | 0.0113 | 0.0339 | 14 | J201 | J200 | 29.64 | |
| J200 | 885.66 | 884.33 | 1.33 | 0.0113 | 0.0339 | 13 | J200 | J185 | 24.38 | |
| J204 | 879.93 | 878.78 | 1.15 | 0.0113 | 0.0339 | 388 | J204 | J205 | 21.44 | |
| J205 | 875.71 | 874.56 | 1.15 | 0.0113 | 0.0339 | 387 | J205 | J202 | 29.43 | |
| J202 | 869.91 | 868.76 | 1.15 | 0.0113 | 0.0339 | 386 | J202 | J203 | 29.56 | |
| J203 | 864.84 | 863.69 | 1.15 | 0.0113 | 0.0339 | 385 | J203 | J197 | 29.47 | |
| J197 | 859.34 | 858.19 | 1.15 | 0.0113 | 0.0339 | 384 | J197 | J191 | 29.44 | |
| J191 | 854.2 | 853.05 | 1.15 | 0.0113 | 0.0339 | 382 | J191 | J192 | 18.99 | |
| J192 | 854.57 | 852.94 | 1.63 | 0.0113 | 0.0339 | 381 | J192 | J189 | 20.11 | |
| J189 | 854.44 | 852.82 | 1.62 | 0.0113 | 0.0339 | 380 | J189 | J895 | 22.35 | |
| J152 | 855.76 | 854.61 | 1.15 | 0.0113 | 0.0339 | 383 | J152 | J191 | 35.03 | |

DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana

ANNEXURE – 5

MUNICIPAL COUNCIL RESOLUTION

DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana



കട്ടപ്പന നഗരസഭാ കാര്യാലയം

ഐ.എസ്.ഒ 9001 : 2015 സർട്ടിഫൈഡ് സ്ഥാപനം കട്ടപ്പന പി. ഒ, ഇടുക്കി ജില്ല. പിൻ– 685 508 ഫോൺ: 04868–272235.

ഇ–മെയിൽ: <u>munsecktpna@gmail.com</u>

കട്ടപ്പന നഗരസഭാ കൗൺസിലിന്റെ 17.11.2021 ലെ 2–ാം നമ്പർ സപ്ലി.തീരുമാനം

കട്ടപ്പന നഗരസഭ – സീവേജ് സിസ്റ്റം നടപ്പാക്കുന്നതിന്റെ ഭാഗമായി മുനിസിപ്പാലിറ്റിയിൽ സീവേജ് ട്രീറ്റ്മെന്റ് പ്ലാന്റ് സ്ഥാപിക്കുന്നതിന് ബഹു.സർക്കാരിൽ നിന്നും തുക അനുവദിക്കുന്ന മുറയ്ക്ക് സ്ഥലം ഏറ്റെടുക്കുന്നതിതുള്ള നടപടികൾ സ്വീകരിക്കുന്നതിന് അനുമതി നൽകി തീരുമാനിച്ചു.

ഒപ്പ്

ചെയർപേഴ്സൻ







Kattappana Municipality

Kattappana P.O, Idukki -685 508

Phone 04868-272235.

email: munsecktpna@gmail.com

Date: 08/11/2021

From

Secretary Kattappana Municipality

To

The Superintending Engineer Sewerage Circle Kerala Water Authority Kochi-11

Sir,

A meeting was conducted with officials of Kerala Water authority – Assistant Executive Engineer, Assistant Engineer and Honourable Chairperson, Secretary and Municipal Engineer of Kattappana Municipality in Municipal Office, Kattappana on 26th Oct. 2021 at 11.00 AM regarding the location confirmation for sewerage treatment plant in Kattappana Municipality. Due to the terraneous landscape and considering the population density, the locations for sewerage network are proposed within selected wards including town and central area with high population density. Also site visits have been done jointly on the same day. During discussion it is confirmed that were extremely willing to provide all necessary support for purchase and provision of Land required as soon as the sanctioning of Government Fund for Land Procurement.

Despatched on az/a/M. Signature <u>Ai</u> AD-Katappana Municipality

DER for 1.76 MLD capacity STP for Sewerage Network& FSSM at Kattapana