



**ST. XAVIER'S COLLEGE**  
(AUTONOMOUS)  
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#### **7.1.4: WATER CONSERVATION FACILITIES AVAILABLE IN THE INSTITUTION**

- ❖ **Rainwater Harvesting**
- ❖ **Bore Well**
- ❖ **Waste Water Recycling**
- ❖ **Testing of Water from Bore Well and Water Purifiers**
  - 2019 – 2020
  - 2018 – 2019
- ❖ **MoU**
  - Grey Water Recycling – Ekonnnect Knowledge Foundation & St. Xavier's College (Autonomous), Mumbai
- ❖ **Expenditure (Representative bills and invoices)**
  - Bore Well – Installation of RCC rings
  - Bore Well – Deeping of ring well
  - Bore Well – Submersible Pump
  - Grey Water Recycling – Ledger Entries (Ekonnnect Project)
- ❖ **Video Link**
  - Water Conservation at St. Xavier's College, Mumbai  
<https://youtu.be/UBR2-CqWJ54>



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# **RAINWATER HARVESTING**



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### ❖ RAINWATER HARVESTING

The college is based in Mumbai city that gets heavy rain during the monsoon period between July through September every year. In order to conserve water, the college rooftop and terrace areas have been connected to pipes that carry the accumulated water down to the ground level. This water is allowed to seep into the soil so as to raise the ground water table. This harvested rainwater replenishes the bore well and recharges the groundwater table.



Rooftop drains on the terrace for rainwater harvesting



Pipes to carry the harvested rain water to ground level



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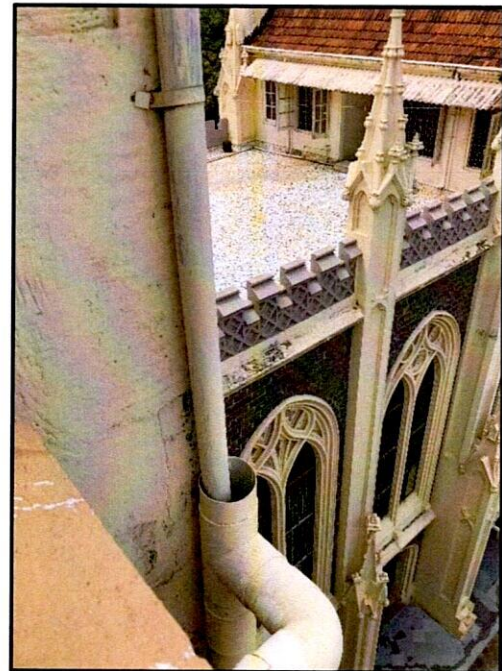
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Pipes to carry the harvested rain water to ground level



Pipes to carry the harvested rain water to ground level

Latitude	18° 56' 34.66" N
Longitude	72° 49' 53.75" E

Latitude	18° 56' 34.66" N
Longitude	72° 49' 53.75" E



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Long shot showing rainwater harvesting pipe reaching ground level from the rooftop

Latitude	18° 56' 34.16" N
Longitude	72° 49' 52.21" E



Rainwater harvesting pipe entering ground

Latitude	18° 56' 34.71" N
Longitude	72° 49' 53.01" E



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## **BORE WELL**





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## ❖ BORE WELL

A bore well is present in the Woods area of the college. It is enclosed with an iron lid as a protective measure. A water pump has been installed in the cement hut adjacent to the bore well. The well water is used to water the green spaces on campus. It is used in the boy's hostel bathrooms and toilets. This has greatly reduced the consumption of Municipal (potable) water for such purposes.



Bore well covered with iron lid. The hut houses the water pump connected to the bore well.



Bore well is recharged by the rain water that seeps into the ground and raises the level of the ground water table.

Latitude	18° 56' 36.46" N
Longitude	72° 49' 55.37" E



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# WASTE WATER RECYCLING





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### ❖ WASTE WATER RECYCLING

On 25<sup>th</sup> July 2019, students of the college along with faculty in-charge Dr Binoj Kutty participated in and were awarded US \$4500 under the 'Youth Mentorship Programme for Environment Conservation' by the US Consulate General, Mumbai, and Ekonnnect Knowledge Foundation, for their project titled 'Recycling Grey Water after treatment by Electrocoagulation' (Award No- SIN65018GR0030). Between August to December 2019, the plant was installed and a successful pilot run was performed on 28<sup>th</sup> November 2019. Ekonnnect representatives visited the site on 9<sup>th</sup> December 2019 to review the work. The students and Dr Binoj Kutty made a presentation on the working status of the project to funding agency members on 30<sup>th</sup> December 2019. Grey water from the Boys' Hostel in College is being treated and reused in the toilet flushes, saving up on copious amounts of clean water.

## RECYCLING GREY WATER AFTER TREATMENT BY LECTROCOAGULATION

### Project Members:

1. Ms. Zubia Shaikh (T.Y.B.Sc. 2018-2019 batch)
2. Ms. Karishma Katpitia (T.Y.B.Sc. 2018-2019 batch)

### Faculty In-charge:

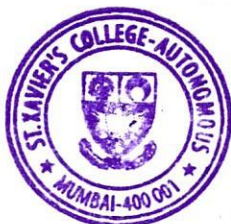
Dr. Binoj C. Kutty  
(Assistant Professor, Department of Life Science and Biochemistry)

### Project Description:

This project aims to treat Grey water from Hostel Building by Electrocoagulation and convert it to usable water.

Electrocoagulation is processes which will make use of electric current (which we plan to generate from solar cells) to electrochemically precipitate or flocculate out contaminants. This unit that can be installed behind the Hostel Building. About 12,000 L of grey water is generated by the hostel per day and the building's flush water requirement is around 6000L. The water treatment shall render the water fit for use in other flushes as well as gardening. The process would take a tank for collecting grey water, an Electrocoagulation tank, Sludge disposal tank, Filtration tank and a treated water tank from which the water can be pumped to flushes. This would involve reworking the pipelines to obtain the grey water source and supplying back the treated water to flushes.

This project for waste water treatment by Electrocoagulation was selected by 'Ekonnnect Foundation' and US Consulate General's 'Youth Mentorship Programme for Environment Conservation' and awarded a grant of US \$4500 to implement the project titled 'Recycling



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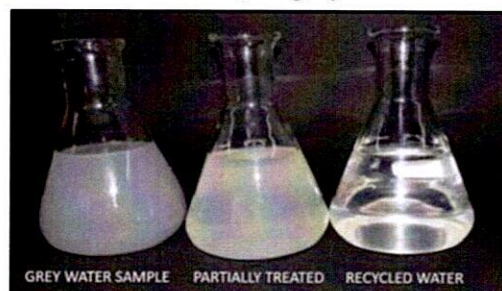
Grey Water after treatment by Electrocoagulation' under the Mentorship Program for Youth Leaders in Environment Conservation (Award No- SIN65018GR0030).

The project was taken for implementation and after various laboratory stage experiments, a pilot set up was installed at the college hostel building. The preliminary laboratory (treatment up to 1 L capacity) work for the project was initiated prior to the mentorship programme and was scaled up (up to 10L) in the laboratory once the grant was awarded. It included purchase of DC power supply, fabrication of EC chambers of various capacities, fabrication of aluminium electrodes etc. Once the parameters were standardized it was decided to scale up the process to a pilot plant (treating approximately 800 -1000L of greywater per day in a batch of 8 hour) at the hostel building. For this a few consultations with few experts were carried out. Installation of the plant needed plumbing and civil work and installation of pipes, pumps, greywater collection tank, treatment chamber, post treatment clean-up and the recycled water collection tank. The project completion timeline was extended up to 31<sup>st</sup> December 2019 by the Ekonnnect team and they had done a project completion visit on 30<sup>th</sup> December 2019. The installed recycling plant was under test runs when the lockdown and closure of hostel took place due to the pandemic.

The entire treatment chamber has aluminium electrodes which will have to be replaced every month or about 10000L of water treatment. Once various parameters are understood, it can be converted to a full-fledged plant and scaled up to handle a higher volume. Since some of the components are electrical, they have a life expectancy of 3 to 4 years based upon usage and load applied. The plant is currently in shutdown and can be restarted only when hostels are opened in full capacity. The plant needs a fixed volume supply of grey water for its operation.



Batch Process for 1L,5L grey water treatment



Treatment Efficiency



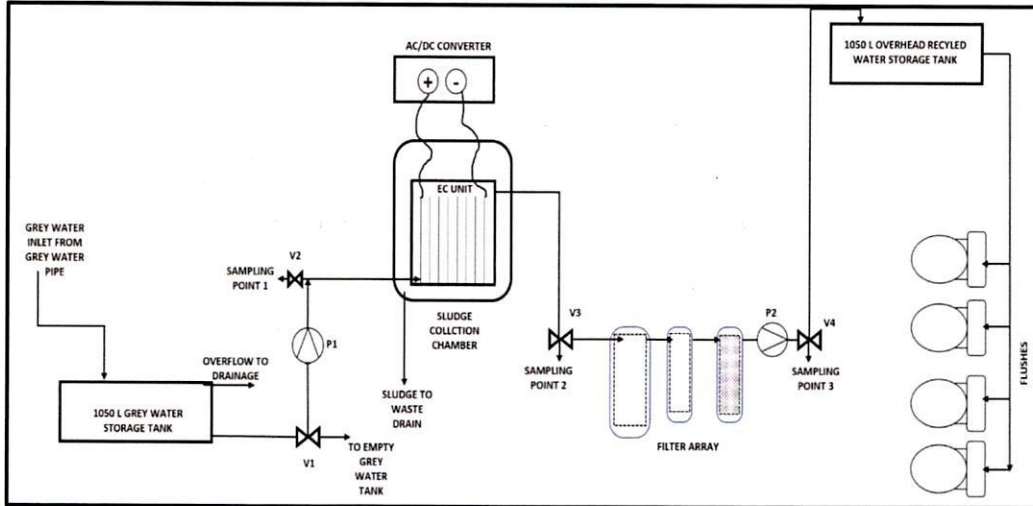
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Flow Diagram of the Electrocoagulation Treatment Process



Photograph of the Electrocoagulation Treatment Pilot Plant  
 Site: Back side of Boys' Hostel, St. Xavier's College (Autonomous), Mumbai.

Latitude	18° 56' 36.46" N
Longitude	72° 49' 56.48" E



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Winning US \$4500 award at the US Consulate, Mumbai (25<sup>th</sup> July 2019)



Ekconnect representatives reviewing the set-up (9<sup>th</sup> Dec. 2019)



Project completion presentation to funding agencies (30<sup>th</sup> Dec. 2019)



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# **TESTING OF WATER FROM BORE WELL & WATER PURIFIERS**



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In addition to the above mentioned measures to conserve water, the college administration ensures the regular maintenance and repair of water taps, faucets, toilet flushes and water storage tanks in the college premises. The water storage tanks and drinking water purifiers are cleaned regularly. Students of the college carry out microbiological and chemical purity tests on the water from these coolers to ensure safe drinking water on campus. It helps them to put into practice the theory studied in the class, and instils in them an attitude of resource conservation and optimal usage. It also ensures timely checking and cleaning of these facilities.

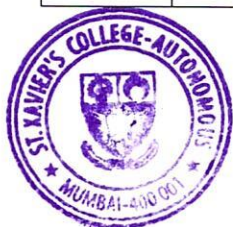
**In order to apply classroom teaching to real life**, students from the Departments of Chemistry and Microbiology carried out testing of the bore well water and water coolers to determine its safety and potability. **This ensured timely checking and cleaning of these facilities.**

## 2019 - 2020


### • Testing of Water from Water Purifiers (38 students)

Students from SYBSc Microbiology, 38 in number, tested the potability of 10 drinking water points in the college every month starting June 2019 through the academic year. They collected water samples in clean, sterile flasks and analyzed the water samples in duplicates using the Multiple Tube Fermentation test. Three reports were made and submitted to the Principal, the HOD for signature and a copy of the reports submitted to the Principal and the Administrator of college every month. In case the water was reported to be non-potable, then the Administrator was advised to get the Water purifier cleaned and a board indicating that the water is not potable was put up till this was done. The water was tested once again after the cleaning of the Water Purifier. All records of the reports are filed in the Department. Dr. Karuna Gokarn and Dr. Pradnya Gogte mentored the students for this activity.

Sr. No.	Name of the Student	UID No.
1	Neha Vijay Shinde	182022
2	Haalah Aijaz Shaikh	182038
3	Aariya Kaushikkumar Shrimanker	182040
4	Shivali Ravindra Shetty	182045
5	Kaushal Gajanan Ghanekar	182054
6	Celia Angelica Lobo	182069
7	Nenoshka Ashwin Aroojis	182099
8	Simran Nahata	182111
9	Evitta Edison	182123
10	Sarah Shajee Thomas	182128



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Sr. No.	Name of the Student	UID No.
11	Swarali Shashikant Bakshi	182143
12	Sayandriila Paul	182148
13	Anjali Vijay Patil	182153
14	Shivani Ashish Kagal	182162
15	Jagjyot Kaur	182170
16	Nikita Dwivedi	182181
17	Kritika Choudhury	182187
18	Pratyusha Dasgupta	182190
19	Akansha Mishra	182209
20	Ria Paul	182224
21	Michelle Michael Machado	182236
22	Stella Ponshekar Nadar	182250
23	Shradha Sales	182267
24	Julia Justin	182296
25	Lester Lawrence Fernandes	182318
26	Sanjana Sainani	182323
27	Geetansh Gupta	182331
28	Khushi Asnani	182341
29	Rachana D	182342
30	Teena Sony	182368
31	Shivank Sadasivan	182379
32	Shivank Sadasivan	182379
33	Triza Rajesh Lahoria	182386
34	Shaoni Nath	182394
35	Venissa Valerian Pereira	182416
36	Jino Kuriakose Kattuparampil	182448
37	Rochelle Gracy Lawrence	182473
38	Romila Maria Tirkey	182531



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2018 - 2019

• **Testing of Water from Water Purifiers (36 students)**

This activity was similar to the one reported for 2019 - 2020.

Sr. No.	Name of the Student	UID No.
1	Esha Ajit Bansal	172071
2	Snigdha Biren Bhattacharyya	172073
3	Mural Edwin Dabre	172075
4	Saily Mangesh Kamble	172083
5	Diana Andrew Menezes	172086
6	Amol Abhay Parab	172087
7	Anjali Singh Rajput	172089
8	Moumita Dev Sengupta	172093
9	Anshit S P Singh	172094
10	Subhashri Sasanka Sekhar Acharya	172098
11	Kavya Nitin Batra	172099
12	Saniket Sunil Bhosle	172101
13	Drishti Anil Chugh	172104
14	Anasruta Debashis Das	172105
15	Maria James Dcosta	172106
16	Ishita Puneet Dewandewan	172107
17	Arpitha Michelle Fredricks George	172113
18	Sanket Nandkumar Gosavi	172117
19	Mohit Lalit Gupta	172118
20	Hanna Zachariah	172119
21	Jenif Leo Anandharaj	172120
22	Jahnvi Pradeep Jeswani	172121
23	Riya Vijay Jotwani	172122
24	Maitri Ravi Khemka	172123
25	Zinnia Frederick Lopes	172125
26	Ishi Manu Mahajan	172126
27	Marwan Sher Mohd Malik	172127



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Sr. No.	Name of the Student	UID No.
28	Priyadarshini Sandeep Mukherjee	172130
29	Shruti Gopal Murmu	172131
30	Kreena Sanjay Nagda	172132
31	Nidhi Ranji	172133
32	Nakul Dhanraj Panchal	172134
33	Rhys Jordan Clyde Pereira	172135
34	Shania Alan Pereira	172136
35	Mathew James Peter Salazar	172142
36	Pranita Atul Shinde	172143

## • Bore Well Water Testing

In academic year 2018-19 work was conducted under the guidance of Prof. Saima Khan, in the undergraduate lab of Department of Chemistry by 5 UG students and a report was submitted based on the analytical data. The work involved the analysis of bore-well water used in St. Xavier's College (Autonomous), Mumbai. Analysis was carried out with respect to its potability and hardness determination. The various parameters studied for this analysis consisted of calcium and magnesium ion hardness determination along with the total hardness of the water sample. The sample was analysed and the results were compared with the respective standard values. Calcium and magnesium ions were estimated by complexometric titration of the water sample against EDTA using Patton and Reeder's indicator (PR) and Eriochrome Black-T (EBT) indicator, respectively. These indicators are originally blue in colour. Both EDTA and the indicator has a capacity to form complexes with the metal ion wherein the Indicator-metal ion complex is less stable than the EDTA-metal ion complex. As a result, when the Indicator-metal ion complex is titrated with EDTA, the metal ions react to form a stronger complex with the EDTA, thereby replacing the indicator molecule. Similarly, a Total Hardness estimation was also carried out using the same analogy and titration techniques.

**Results:** These physico-chemical studies stated that all drinking water quality parameters were found on the borderline for the studied water sample, as prescribed by ISI. From the results, it was evident that the chemical parameters were not within the suitable limits. Hence, it was concluded that the water from the bore-well is unsuitable for drinking as per specifications. It could however, be utilized for washing and cleaning purposes.



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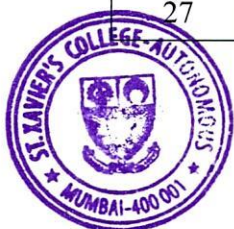
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**2017 - 2018**


• **Testing of Water from Water Purifiers (37 students)**

This activity was similar to the one reported for 2019 - 2020

Sr. No.	Name of the Student	UID No.
1	Alva Namita Sasha Norbert	162034
2	Rebello Jardin Gabriel	162069
3	Faria Rachel Rex Rogers	162072
4	Premrajka Kartikeyan Alok	162156
5	Mahadevan Ritika Mahadevan	162157
6	Bapna Ishita Vivek	162174
7	Gomes Larissa Lazarus	162188
8	Teena Thomas	162191
9	Fernandes Ioana Christina Alex	162201
10	Leeza Elizabeth John	162203
11	Ummalaraju Hari Chalapathi Raju	162215
12	Patel Joanne Perpetua Rocky	162216
13	Gaikwad Anagha Daniel	162233
14	Jose Jerry Jose	162236
15	Bali Rimjhim Alok	162237
16	Garg Meenakshi Balkishan	162249
17	Riya Baby	162254
18	Puthoore Maria Joshi	162256
19	Adhikari Saanjvati Soumyakanti	162274
20	Busi Nancy Eunice Samuel	162276
21	Saha Sreedeepta Saumen	162290
22	Singh Ankita J K	162296
23	Kapoor Aradhya Adarsh Kapoor	162321
24	Cardoza Sharon Benjamin	162348
25	Gunda Vandana Laxman	162352
26	Baptist Savannah Shyann Norman	162354
27	Ganduri Sunidhi Srinivas	162355



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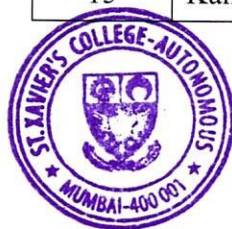
Sr. No.	Name of the Student	UID No.
28	Melissa Joseph	162385
29	Pereira Stacy Louise Giles	162405
30	Mittal Raghav Kumar Shyam	162435
31	Zainab Iqbal	162436
32	Joshi Shiva Rakesh	162442
33	Mascarenhas Sanarita Stany	162451
34	Soam Sakshi Krishan	162458
35	Fernandes Ashley Leon Peter	162482
36	Saldanha Rochelle Ronald	162508
37	Nulkar Swanandee Sudhanshu	162535

**2016 - 2017**

• **Testing of Water from Water Purifiers (48 students)**

This activity was similar to the one reported for 2019 - 2020

Sr. No.	Name of the Student	UID No.
1	Abel Mathew Abraham	152252
2	Banwani Neha Vinod	152202
3	Chandavarkar Ritvik Sandeep	152245
4	Choudhari Neha Pradeep	152470
5	D Cunha Rebekah Emelina Cajetan	152174
6	Dali Sanchi Rajeev	152173
7	Dharmadhikari Shivani	132387
8	Dsilva Tracy Richard	152205
9	Fereira Lenisa Oneil	152176
10	Fernandes Concetta George	152132
11	Jafri Moneza	152442
12	Jain Nancy Tarunkumar	152259
13	Jawade Ketki Suresh	152318
14	Kalappila Tinci Thomas	152258
15	Kanodothankandy Lavanya Jitendra	152111



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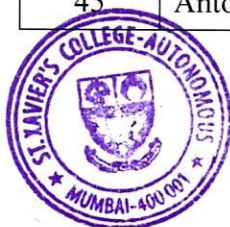
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16	Khetan Priya Rajesh	152434
17	Lucas Stefney Stanislaus	152222
18	Madakasira Geervani	152171
19	Malik Simran Ajay	152441
20	Mubasshira Mohammad Mazhar Ul Haque	152467
21	Panda Sharmistha Prasant	152288
22	Paul Anusikha Ashish	152410
23	Pereira Danisha Lourdes Philip	152186
24	Pinto Sian Mario	152285
25	Riya Maria Reginald	152188
26	Rodrigues Renita Maria Ronald	152107
27	Roy Arkanil Gautam	152427
28	Sahni Savitri Bindeshwar	152296
29	Saikia Bibakhya Bhaben	152413
30	Sanyal Avirup Jyoti	152280
31	Sanyal Chadni Bhaskar	152278
32	Sharon Alex	152152
33	Tavkari Shreeya Prabhu	152530
34	Vazhapilly Anish Ittoop John	152290
35	Almeida Rachel Richard	152268
36	Chavan Vipula Arvind	152456
37	Dsouza Analiza Francis	152045
38	Fargose Rachel Rajesh	152377
39	Fernandes Francis Minino	152385
40	Gonsalves Fravela Frank	152331
41	Kaitharath Alina Paul	152348
42	Kannoralil Sharon Varghese	152374
43	Kevaley Charisma Ohm Prakash	152361
44	Puthoor Jaison Johnson	152449
45	Antony Blessy Brijit	152251



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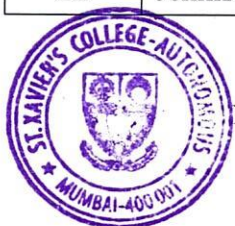
Sr. No.	Name of the Student	UID No.
46	Arambur Daniel Domnic	152232
47	Mohan Kabyashree Kshirod	152281
48	Gawai Samidha Sanjay	152539

## 2015 - 2016

### • Testing of Water from Water Purifiers (41 students)

This activity was similar to the one reported for 2019 - 2020

Sr. No.	Name of the Student	UID No.
1	Gaonkar Sampada Sunil	142453
2	Khemani Prashant J.N	142182
3	Kinny Priya Philip	142222
4	Poonam Dharmbir	142279
5	Raut Sneha Anand	142449
6	Rodrigues Minilsa Wilson	142293
7	Varkey Abel Cherian	142172
8	Anisha Susan Thomas	142242
9	Aquinas Natasha Christopher	142290
10	Aranha Lavita Supriya Leo	142059
11	Arora Shivam Om Prakash	142605
12	Baptista Elvira Nerus	142214
13	Bose Sushmita Kalyan	142002
14	Cabral Katherine Harold	142362
15	Chaudhuri Shayoni Abhijit	142212
16	Dsouza Ciana Amelia Augustine	142055
17	Dsouza Georgia Lena Cyril	142330
18	Fernandes Henrietta Marshal	142109
19	George Jacob	142174
20	Ghare Fathema Mahmud Husain	142613
21	Jacqueline Varkey	142302
22	Jennifer Mary Varghese	142409



NAAC SSR Cycle 4 (2015-2020):  
7\_1\_4\_WaterConservation

PRINCIPAL  
ST. XAVIER'S COLLEGE  
(AUTONOMOUS)  
MUMBAI - 400 001.




**ST. XAVIER'S COLLEGE**  
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5, Mahapalika Marg, Mumbai - 400 001,  
INDIA.  
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Sr. No.	Name of the Student	UID No.
23	Keertana Venkatesh	142157
24	Kizhakkayil Christy Thomas	142233
25	Kumar Pradhyumn Kailash	142235
26	Mathew Keya George	142066
27	Mendonca Enid Jerome	142086
28	Mishra Subrata Sanjaya Kumar	142464
29	Mukherjee Shalini Sovon	142472
30	Phale Apurva Prashant	142185
31	Pires Pearl Agnello	142543
32	Reshamwala Kunal Amit	142252
33	Robin Joseph Paul	142341
34	Roy Ritwika Sudipto	142158
35	Shetty Priscilla Francis	142217
36	Sanjana T. Philip	142159
37	Varak Pooja Sitaram	142271
38	Verma Chandrika Rajesh	142301
39	Williams Wynola Elsie Harold	142160
40	Rastogi Rishav Shyam	142632
41	Dey Arundhati Arun	132359



NAAC SSR Cycle 4 (2015-2020):  
7\_1\_4\_WaterConservation

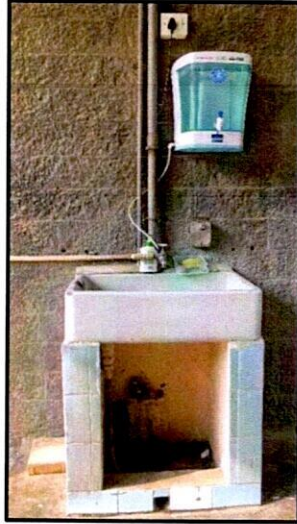
  
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### Drinking Water Points on Campus (Representative examples)



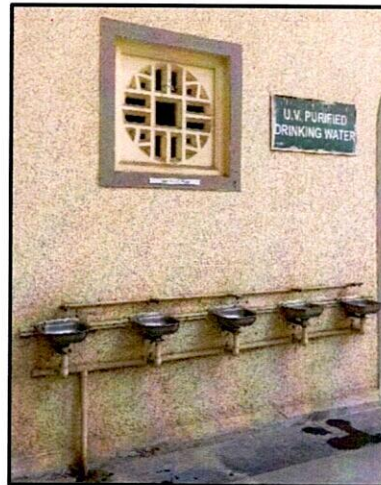
(1)



(2)



(3)



(4)

Sr No.	Location	Latitude	Longitude
(1)	Near Treasurer's Office	18° 56' 36.24" N	72° 49' 52.13" E
(2)	Near Canteen Foyer	18° 56' 36.04" N	72° 49' 53.88" E
(3)	Near LR – 12 (1 <sup>st</sup> floor)	18° 56' 35.57" N	72° 49' 53.77" E
(4)	Near Volley ball court	18° 56' 35.19" N	72° 49' 54.32" E



NAAC SSR Cycle 4 (2015-2020):  
7\_1\_4\_WaterConservation

*Offi n de*  
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**ST. XAVIER'S COLLEGE**  
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**MoU**  
**Grey Water Recycling: Ekonnnect Knowledge Foundation**  
**& St. Xavier's College (Autonomous), Mumbai**





## Ekonnnect Knowledge Foundation

504/505, 5th Floor, Balarama Building, Bandra Kurla Complex, (BKC),  
Near MMRDA office, Bandra (E), Mumbai 400 051, INDIA.

T: +91-22-62215944 / 5946  
W: www.ekonnnect.net

### Letter of Understanding

This Letter of Understanding ("LoU") is signed on **7<sup>th</sup>** day of **August 2019**

Between

**Ekonnnect Knowledge Foundation**, is a non-profit Section 8 company, established in 2012, having its registered office at 504/505, 5th Floor, Balarama Building, Opposite MMRDA Office, Bandra Kurla Complex, Bandra East, Mumbai 400 051, hereafter referred to as "Ekonnnect"

And

**St. Xavier's College - Autonomous, Mumbai**, is a not for profit educational institute with campus located at 5, Mahapalika Marg, Mumbai 400-001, Maharashtra, India, 'hereafter referred to as "Institution".

Whereas,

- a) **Ekonnnect, FCRA number: 083781552 (Refer Annex A1)** with is a non-profit Section 8 company, established in 2012 that aspires to build a more responsible and sustainable world by raising awareness, building appropriate content, conducting training, creating and disseminating knowledge products, demonstrating and promoting sustainable practices supporting eco-entrepreneurship and establishing knowledge networks on the theme of environmental management and sustainability.
- b) ***Bombay St Xaviers College Society (St. Xaviers College- Autonomous, Mumbai)*, with FCRA number: 083780037 (Refer Annex A2)** is a non-profit educational institute established in 1869 and affiliated to the University of Mumbai. The college now in the 150<sup>th</sup> year strives to be a true Jesuit institute. Our vision is to be an academic community dedicated to the holistic education of future leaders who will demonstrate innovation in their professional competencies, integration in their personal lives and inclusion in their social contribution.

### **Background**

Ekonnnect Knowledge Foundation (Ekonnnect) and the U.S. Consulate General, Mumbai (USCG-M) partnered and developed a nine-month youth leadership program (Award No- SIN65018GR0030) that matches environmental experts (mentors) with young leaders (mentees) to bring to life scalable, replicable and innovative solutions that address environmental challenges.

The objectives of the program are:

- Educate young leaders on entrepreneurial and problem-solving skills in relation to environmental sustainability
- Catalyze the conception of innovative sustainable solutions that address India's pressing challenges in relation to natural resource stewardship as well as air, water and other pollution

Applications were sought from various eligible institutions in the western region of India for conceiving and implementing short projects on the themes of Water Management, Air Quality Monitoring &



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Control, Organic Solid Waste Management, Renewable Energy & Energy Efficiency, Plastic Waste Management and Biodiversity.

Five mentee teams were selected to undergo training in three workshops and develop an implementable project plan and skills in leadership. The three workshops addressed the following:

1. Concept plan to project plan (6<sup>th</sup> February 2019)
2. Project plan to environmental decision making (16<sup>th</sup> April 2019)
3. Understanding grassroots operations (15<sup>th</sup> July 2019)

Each workshop had presentations and interactive session(s). In addition, eco-entrepreneurs were invited to speak on their journey and share their success story.

A pitching session and award ceremony was conducted on 25<sup>th</sup> July 2019 to select two teams who could be awarded a grant to implement their project over a three-month period (August, September and October 2019).

### Description of the Project

St. Xavier's College, Mumbai (Autonomous) has been awarded a grant to implement the project titled 'Recycling Grey Water after treatment by Electrocoagulation' under the Mentorship Program for Youth Leaders in Environment Conservation (Award No- SIN65018GR0030).

### Project Theme:

Water Management

### Problem Statement:

Fresh water availability is a crisis worldwide and particularly affects India. The NITI Aayog in a June 2018 study warns that India is facing its 'worst' water crisis in history and the demand is likely to double the supply by 20. Nearly 600 million Indians faced high to extreme water stress in the last year alone. St. Xavier's College, Mumbai, during the month of January to March 2019 faced acute water shortage, due to frequent water cuts and reduced supply from the Municipal Corporation and depletion of the ground water in the in house bore well. To meet the regular needs the college, the college had to incur frequent purchases of tanker water. It is estimated that about 40 to 60 % of fresh water used is discarded as Grey water which can be treated and recycled for non potable use.

### Desired Solution:

The project aims to design and develop a modular small scale grey water treatment technology- based on the principle of 'Electrocoagulation'. When electricity is passed through polluted water through sacrificial metal electrodes, the metal ion dissociate in to the water. The dissociated metal ions will attract pollutants and coagulate them. The coagulated floccs formed can be then easily filtered or separated. During this treatment, the polluted water loses its turbidity, COD, BOD and can be reused for flushes, gardening and other non-contact use. This will offset fresh water use in areas where fresh water is not needed and enhance its availability for potable use.





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The case in point for implementation is St. Xavier's College, Mumbai (Autonomous). The grey water shall be collected from the hostel building and post treatment the recycled water shall be supplied to the flush tanks in the same building. This can ensure a savings of about 7000 L of fresh water daily and will eventually translate into financial savings spent on fresh water purchase. Last year the college bore approximately Rs. 40,000/- additional cost for fresh water purchase during the water deficient period of 3 months. Efficient recycling will offset this demand and reduce expenditure.

The project will involve design development installation and implementation of an Electrocoagulation unit. Once developed the modular Electrocoagulation unit can be replicated at other residential buildings, individual homes and public toilets. Their utility in the numerous new public toilet constructions is a promising solution to meet the goals of improved sanitation and water savings.

The Institution nominates the following students to carry out the implementation of the project as described above. Refer **Annex B**.

1. *Zubia Shaikh*
2. *Karishma Katpitia*

### Amount and Time Period

1. Ekonnnect hereby agrees to grant US \$4500 to the Institution to carry out the activities as described in the project work plan. Refer **Annex C & D** for details on project work plan and bank account details of the Institution.
2. Funds granted are available to reimburse project expenditures as shown in the Budget. Refer **Annex E** for detailed budget.
3. The effective grant period is from August 1, 2019 to October 31, 2019. The project is to be implemented during the above period.
4. Any expenditure that may occur either before or after the project implementation period is to be borne solely by the Institution.
5. Any expenditure in excess to the grant fund is to be borne solely by the Institution.

### Grant Disbursement and Reporting Obligations

1. Disbursements of the grant fund will be paid on a monthly basis following submission of a Monthly Financial Report ("MFR"), and Monthly Narrative Reports ("MNR") on the status of the project implemented by the Institution. Refer **Annex F & Annex G** for formats of the MFR and MNR.
2. The Institution will submit the MFR and MNR to Ekonnnect by the 15<sup>th</sup> day of the next month for the previous month's activities.
3. The MNR shall provide a status against the proposed work plan and associated timeline.
4. Both MFR and MNR shall be attested by the Institution prior to submission.
5. Reimbursements shall not include the time value of money spent by the Institution on the project.
6. All original attested receipts, bills and financial records substantiating grant expenditures must be submitted with the MFR.
7. Disbursements will be made once this agreement is signed and an approved Budget and work plan for the project is provided by the Institution at the time of signing the agreement.



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8. A Final Financial Report and Narrative Report will be submitted by the Institution at the end of the project implementation period incorporating statements and status provided in the previous monthly reports submitted by the Institution.
9. Actions taken against the findings and observations provided by Ekonnnect during project review/evaluation shall be included in the report.
4. The Institution shall ensure that there will be no release of any information of the project '**Recycling Grey Water after treatment by Electrocoagulation**' to the media without prior approval of Ekonnnect.
5. All publications and showcases (presentations/seminars) of the project by the Institution, will only be carried out post successful completion of the project and closure of all associated transactions cleared by Ekonnnect.
6. In case the Institution wishes to present or showcase the project, either to media or in form of a research paper, they must acknowledge the U.S. Consulate General, Mumbai (Award No-SIN65018GR0030), associated Mentor and Ekonnnect.

### Fixed and Capital Assets

1. All capital expenditures carried out for this project will be specifically restricted to the use of the project '**Recycling Grey Water after treatment by Electrocoagulation**' alone.
2. On conclusion of the project, these equipment/assets may be transferred to the Institution or representatives appointed by the Institution for continuous maintenance.
3. The Institution, will ensure that these equipment/assets are continued to be used and maintained in satisfactory condition.

### Project Review

1. Ekonnnect and U.S. Consulate General, Mumbai will conduct two site visits, one during the course of project implementation and second, post the project completion. The mentor will also be present during the project review visit.
2. Recommendations suggested by the project review team post site visit will be incorporated suitably into the project.
3. Expenses for conduct of the site visit shall be borne by Ekonnnect, however the Institution will ensure facilitation of the site visit. Prior intimation of at least seven days will be provided by Ekonnnect to the Institution.
4. Institution needs to report implementation status to the Mentor on a fortnightly basis with a copy sent to Ekonnnect.

### Modifications

1. Any alteration in the project implementation team or project plan or project expenditures shall be carried out only after approval from Ekonnnect and on providing sufficient justification.





## Ekonnnect Knowledge Foundation

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2. Intimation of alterations should be provided to Ekonnnect at least 30 days prior to the scheduled change.
3. It should be noted that alterations are not encouraged and Ekonnnect reserves the right to decline a request for alteration.

### Liability

1. The Institution shall ensure that adequate safety mechanisms are employed during project implementation to ensure safety of persons, equipment, and process involved.
2. Ekonnnect does not assume liability for any claims for damages arising out of this grant.
3. This engagement letter will be governed in accordance with the laws of India and shall be subject to the exclusive jurisdiction of the courts in Mumbai.

Sign and Seal of **ST. XAVIER'S COLLEGE** Autonomous,  
Mumbai  
Name: Dr. Rajendra Shinde  
Title: Principal  
Date: 7<sup>th</sup> August, 2019

*Shinde*



Sign and Seal of Ekonnnect Knowledge  
Foundation  
Name: *Prayodk*  
Title:  
Date: 7<sup>th</sup> August, 2019



### List of Annexes (to be attached with the final signed 'LoU'):

- Annex A1 – Foreign Contribution Regulation Act (FCRA) license certificate of the Ekonnnect Knowledge Foundation.
- Annex A2- Foreign Contribution Regulation Act (FCRA) license certificate of the institution
- Annex B – Bonafide letter from Institution for the students (mentees).
- Annex C – Final approved work plan
- Annex D–Account details of the Institution authorised to obtain grants under the Foreign Contribution Regulation Act.
- Annex E – Final approved budget plan
- Annex F – Format for submission of Monthly Financial Report ("MFR")
- Annex G – Format for submission of Monthly Narrative Reports ("MNR")

### Annex F – Format for submission of Monthly Financial Report ("MFR")

Recipient of Grant	St. Xavier's College- Autonomous, Mumbai
Title of Project	Recycling Grey Water after treatment by Electrocoagulation'
Award Number	SIN65018GR0030



**ST. XAVIER'S COLLEGE**  
(AUTONOMOUS)  
5, Mahapalika Marg, Mumbai - 400 001,  
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**EXPENDITURE**  
**(Representative Bills & Invoices)**





**ST. XAVIER'S COLLEGE**  
 (AUTONOMOUS)  
 5, Mahapalika Marg, Mumbai - 400 001,  
 INDIA.  
 ☎ 2262 0661/65

2019 - 2020

L/357, DREAMS MALL,  
 LBS MARG, BHANDUP WEST  
 MUMBAI - 400 078, 9967662903  
 EMAIL: aolek.gwes@gmail.com

**GROUND WATER EXPLORATION SERVICE**

---

**TAX INVOICE**

To,  
 St. Xaviers College  
 5, Mahapalika Marg, Dhobi Talao,  
 Chhatrapati Shivaji Terminus, Fort,  
 Mumbai, Maharashtra 400001.  
 GST NO.:-

Date:-01/04/2019  
 Inv.no:- GWES/1/011/0419  
 P.O.no:-  
 Site:- Fort.

*Sir*

Sr.no.	Description	Qty.	Rate (Rs)	Total	GST	G.Total
1	Supply and installation of RCC Ring of 5 ft. dia.(including loading, unloading, transportation and installation charges).	10 R.	6,500/-	65,000/-	18%	76,700/-
2	Charges for civil work (RCC Cover).	1	10,000/-	10,000/-	18%	11,800/-
Total:- Eighty eight thousand five hundred only.						88,500/-



GST NO.:- 27BLNPS5270H1ZK  
 PAN NO.:- BLNPS5270H

*Document of Procurement (Desummed with health & safety Plan)*

*22/ APR 2019*

*BB Sharm*

**Ground Water Exploration Service**

*Shinde*  
**PRINCIPAL**  
 St. Xavier's College  
 Mumbai-400 001.

Bore Well – Installation of RCC rings



NAAC SSR Cycle 4 (2015-2020):  
 7\_1\_4\_WaterConservation

*Shinde*  
**PRINCIPAL**  
**ST. XAVIER'S COLLEGE**  
 (AUTONOMOUS)  
 MUMBAI - 400 001.



**ST. XAVIER'S COLLEGE**  
 (AUTONOMOUS)  
 5, Mahapalika Marg, Mumbai - 400 001,  
 INDIA.  
 ☎ 2262 0661/65

EST  
Feb  
BP-146, 147

L/357, DREAMS MALL,  
 LBS MARG, BHANDUP WEST  
 MUMBAI - 400 078, 9967662903  
 EMAIL: aalok.gwes@gmail.com

**GROUND WATER EXPLORATION SERVICE**

---

**TAX INVOICE**

To: St. Xaviers College  
 5, Mahapalika Marg, Dhobi Talao,  
 Chhatrapati Shivaji Tannaras, Furt,  
 Mumbai, Maharashtra 400001.  
 GST NO.:-

Date:-11/02/2019  
 Inv.no:- GWES/V/112/0219  
 P.O.no:-  
 Site:- Fort.

Sr.no.	Description	Qty.	Rate (Rs)	Total
1	Deeping of ring well. from 13' to 23'	10 ft	10,000/-	1,00,000/-
			CGST @ 9%	9,000/-
			SGST @ 9%	9,000/-
<b>G.Total:- one lac eighteen thousand only.</b>				<b>1,18,000/-</b>

GST NO.:- 27BLNPS5270H1ZK  
 PAN NO.:- BLNPS5270H

118000  
 Tax 11%  
 (on 100000) 11000  
 117000

Ground Water Exploration Service

well as per  
 the condition dt  
 20/11/2019

① Previous level  
 of well 13'

② Present level of  
 well. 23'

16/2/19

13/2/19

118000  
 135511  
 11828568  
 11828569  
 13/2/19

Major Repair College Bldg

Bore Well - Deeping of ring well



NAAC SSR Cycle 4 (2015-2020):  
 7\_1\_4\_WaterConservation

*Shinde*  
 PRINCIPAL  
 ST. XAVIER'S COLLEGE  
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# ST. XAVIER'S COLLEGE

(AUTONOMOUS)

5, Mahapalika Marg, Mumbai - 400 001, INDIA.

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*2nd Pump -  
Pon Borewell*

*Est  
No  
EP-AS*

GROUND WATER EXPLORATION SERVICE

U/357, DREAMS MALL,  
LBS MARG, BHANDUP WEST  
MUMBAI - 400 078, 9967662903  
EMAIL: [analek.guest@gmail.com](mailto:analek.guest@gmail.com)

## TAX INVOICE

To,  
St. Xavier's College  
5, Mahapalika Marg, Dhobi Talao,  
Chhatrapati Shivaji Terminus, Fort,  
Mumbai, Maharashtra 400001.  
GST NO.:-

Date:-11/02/2019  
Inv.no:- GWES/1111/0219  
P.O.no:-  
Site:- Fort.

Sr.no.	Description	Qty.	Rate (Rs)	Total	GST	G Total
1	KSB make submersible pump 3 HP	1	24,350/-	24,350/-	12%	27,272/-
2	Padmanshab make digital control panel	1	5,850/-	5,850/-	18%	6,903/-
3	PVC pipe.	30 ft.	48/ft	1,440/-	18%	1699 2/-
4	Flat cable 1.5mm	40 ft.	72/ft	2,880/-	18%	3,398 4/-
5	Clamp, wellcover.	1	2,000/-	2,000/-	18%	2,360/-
6	Installation of pump and extra fittings.	1	10,000/-	10,000/-	18%	11,800/-
<b>Total:-</b>						<b>53,432.6/-</b>
<b>Round off (-)</b>						<b>-.6/-</b>
<b>G.Total:- Fifty three thousand four hundred thirty two only.</b>						<b>53,432/-</b>

GST NO.:- 27BLNPSS270H1ZK  
PAN NO.:- BLNPSS270H

*26 FEB 2019*

*Approved by*

*26/02/19*

*PRINCIPAL*

*St. Xavier's College*

*Mumbai-400 001.*

*Major Repair Bdy*

*53432*

*1700*

*53332*

Ground Water Exploration Service

Bore Well – Submersible Pump



NAAC SSR Cycle 4 (2015-2020):  
7\_1\_4\_WaterConservation

*Shinde*

PRINCIPAL  
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(AUTONOMOUS)  
MUMBAI - 400 001.

# The Bombay St. Xavier's College Society

5, Mahapalika Marg,

Mumbai

## Ekonnnect Project US Consulate

Ledger Account

1-Apr-2019 to 31-Mar-2020

Page 1

Date	Particulars	Vch Type	Vch No.	Debit	Credit
23-9-2019	Cr Lovely Sanitary & Hardware <i>Being paid towards purchase of hardware and plumbing materials for project.</i>	Journal	1	9,605.00	
25-9-2019	Dr 886 : Corporation Bank <i>Being recd towards donation from Ekonnnect knowledge foundation , Add: 504/505, 5th floor, Balarama Building Bandra kurla complex, (BKC) near MMRDA office bandra (E), Mumbai 4000051, India</i>	Receipt	1		68,413.00
	Dr 886 : Corporation Bank <i>being recd towards donation from Ekonnnect Knowledge foundation</i>	Receipt	2		19,680.00
30-9-2019	Cr Sun Chem Trading Co. <i>Being Laboratory Testing and Measuring Equipment purchased HSN code 9027</i>	Journal	2	14,160.00	
	Cr 886 : Corporation Bank <i>#806910 Being paid towards Lovely sanitary &amp; hardware for Ekonnnect project us consulate Exp</i>	Bank Payment	BP-3	37,960.00	
7-10-2019	Cr 886 : Corporation Bank <i># 804328 Being paid to Zubia Shaikh towards reimbursement of expenses incurred on travel and miscellaneous exp.</i>	Bank Payment	BP-2	9,005.00	
10-10-2019	Cr Cash <i>Being paid towards printing and stationery exp for TDS</i>	Cash Payment	CP-1	1,070.00	
	Cr (as per details) TDS ON EXP. 130.00 Cr 886 : Corporation Bank 12,870.00 Cr <i># 804330 Being paid to Santosh Kamble towards plumbing work done for project.</i>	Bank Payment	BP-4	13,000.00	
18-10-2019	Cr 886 : Corporation Bank <i>#806909 Being paid towards mel services to Ekonnnect Project us consulate .</i>	Bank Payment	BP-8	1,770.00	

Carried Over



*Shinde*  
PRINCIPAL  
ST. XAVIER'S COLLEGE  
(AUTONOMOUS)  
MUMBAI - 400 001.

86,570.00 88,093.00

continued ...



Date	Particulars	Vch Type	Vch No.	Debit	Credit
	Brought Forward			86,570.00	88,093.00
31-10-2019	Cr Cash <i>Being paid towards fabrication charges and harware charges for Ekonnnect</i>	Cash Payment	CP-2	3,220.00	
1-11-2019	Cr 886 : Corporation Bank <i># 864092 Being paid Raj Guru Plastics towards Acryllic Boxed for the Ekonnnect project exps</i>	Bank Payment	BP-1	3,599.00	
	Cr 886 : Corporation Bank <i>#864095 Being paid Tushar Desai towards the Honorarium</i>	Bank Payment	BP-2	2,000.00	
	Cr 886 : Corporation Bank <i># 864091 Being paid Zubia Shaikh towards travel &amp; stationery</i>	Bank Payment	BP-3	8,260.00	
4-11-2019	Cr 886 : Corporation Bank <i># 864097 Being paid karishma kalphia towards to Reimbursment</i>	Bank Payment	BP-4	1,866.00	
14-11-2019	Cr 886 : Corporation Bank <i># 804336 Being Paid to Karisham Katpitia towards reimbursment of expenses incurred on purchased of Professional waterproof PH meter and temperature Probe backlight.</i>	Bank Payment	BP-5	2,560.00	
	Cr Flowtek Engineering <i>Being paid towards purchased of Turbidty Meter for Project.</i>	Journal	3	7,080.00	
16-11-2019	Cr 886 : Corporation Bank <i># 804338 Being paid to iFlow Irrigation system towards purchased of Filter.</i>	Bank Payment	BP-7	11,000.00	
	Dr 886 : Corporation Bank <i># Being recd towards Donation NEFT from Ekonnnect Knowledge foundation</i>	Receipt	2		70,870.00
	Dr 886 : Corporation Bank <i>Being recd towards donation NEFT from Ekonnnect knowledge foundation</i>	Receipt	3		28,249.00
	Cr 886 : Corporation Bank <i># 804342 Beignp paid towards to flowtek Engineering</i>	Bank Payment	BP-8	4,484.00	
	Cr 886 : Corporation Bank <i># 804341 Being paid towards Raj Guru Plastics for purchase of filter part</i>	Bank Payment	BP-9	7,670.00	
	Carried Over			1,38,309.00	1,87,212.00



*Shinde*  
 PRINCIPAL  
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Date	Particulars	Vch Type	Vch No.	Debit	Credit
	Brought Forward			1,38,309.00	1,87,212.00
16-11-2019	Cr 886 : Corporation Bank # 804340 Being paid towards Lite kiran for purchase Aqwa Bottel & C T,O bleed	Bank Payment	BP-10	1,475.00	
18-11-2019	Cr 886 : Corporation Bank #804343 Being paid Lovely sanitary & Hardware	Bank Payment	BP-11	3,375.00	
21-11-2019	Cr 886 : Corporation Bank # 804345 Being paid towards commerce corporation for SMP 0 -128/2.5-25A	Bank Payment	BP-12	61,714.00	
23-11-2019	Cr 886 : Corporation Bank # 804322 Being paid towards Rajasthan Metal House	Bank Payment	BP-13	10,030.00	
4-12-2019	Cr 886 : Corporation Bank # 804323 Being paid towards Krishma Faredun for Ekonnnect project	Bank Payment	BP-1	3,452.00	
	Cr 886 : Corporation Bank #804324 Being paid towards Flowtek engineering for ekonnnect project	Bank Payment	BP-2	340.00	
6-12-2019	Cr 886 : Corporation Bank #804349 Being paid towards Bombay Paints Hardware for the Ekonnnect project	Bank Payment	BP-3	348.00	
	Cr 886 : Corporation Bank #804350 Being paid towards Raj guru Plastics to Ekonnnect project	Bank Payment	BP-4	1,355.00	
	Cr (as per details) 886 : Corporation Bank 846.00 Cr TDS ON EXP. 15.00 Cr #804347 Being paid towards Daksha copy for Ekonnnect project	Bank Payment	BP-7	861.00	
10-12-2019	Cr 886 : Corporation Bank #804366 Being paid towards for the kanal programme done by the student	Bank Payment	BP-8	2,200.00	
12-12-2019	Cr (as per details) 886 : Corporation Bank 14,902.00 Cr TDS ON EXP. 25.00 Cr # 804325 Being paidm towards Aqusafe for purchase Pressure Pump, power supply Adapter, Jumbo Housing & Pump Elbow, Brass Nozel & PVC PIPE 3/8 & services charges.	Bank Payment	BP-9	14,927.00	
	Carried Over			2,38,386.00	1,87,212.00



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Date	Particulars	Vch Type	Vch No.	Debit	Credit
	Brought Forward			2,38,386.00	1,87,212.00
12-12-2019	Cr 886 : Corporation Bank #804351 Being paid towards Neelgiri Electrix for Ekonnnect project	Bank Payment	BP-10	2,500.42	
20-12-2019	Dr 886 : Corporation Bank # Being recd towards donation NEFT from Ekonnnect Knowledge foundation	Receipt	1		10,030.00
	Dr 886 : Corporation Bank # Being recd towards Donation Neft from Ekonnnect knowledge foundations	Receipt	2		63,789.00
	Cr 886 : Corporation Bank #864099 Being paid towards Krishma Katpitiam for Ekonnnect project	Bank Payment	BP-13	797.00	
	Cr 886 : Corporation Bank # 864096 Being paid towards Nayan Khambati for Ekonnnect project	Bank Payment	BP-14	4,000.00	
21-12-2019	Cr (as per details) TDS ON EXP. 2,808.00 Cr 886 : Corporation Bank 30,326.00 Cr # 864100 Being paid towards Italab Private Limited for purchase chemical oxygen & n Bio- chemical oxygen Demand	Bank Payment	BP-15	33,134.00	
31-12-2019	Cr 886 : Corporation Bank Being paid towards labour charges paid to college staff	Bank Payment	BP-17	2,200.00	
3-1-2020	Cr 886 : Corporation Bank #864105 Being paid towards Neelgiri Electrix for ekonnnect project	Bank Payment	BP-2	2,500.42	
	Cr (as per details) TDS ON EXP. 7.00 Cr 886 : Corporation Bank 854.00 Cr #864106 Being paid towardsn daksha copy centre for ekonnnect project	Bank Payment	BP-3	861.00	
	Cr 886 : Corporation Bank # 864103 Being paid to Sanjay Sawant electrision .	Bank Payment	BP-4	500.00	
	Cr 886 : Corporation Bank # 864104 Being paid to Mangesh Gade for helping electrition .	Bank Payment	BP-5	500.00	
	Carried Over			2,85,378.84	2,61,031.00



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Date	Particulars	Vch Type	Vch No.	Debit	Credit
	Brought Forward			2,85,378.84	2,61,031.00
3-1-2020	Cr 886 : Corporation Bank # 864098 Being paid to Lovely Sanitary	Bank Payment	BP-6	1,982.00	
	Cr 886 : Corporation Bank Being paid to Karishma towards ekonnnect expenses reimbursement	Bank Payment	BP-7	5,340.00	
	Cr 886 : Corporation Bank # 864094 Being Honorarium paid to Shriya Bhatia .	Bank Payment	BP-8	4,000.00	
17-1-2020	Cr (as per details) TDS ON EXP. 139.00 Cr 886 : Corporation Bank 16,209.00 Cr #864108 Being paid towards shah decor for Ekonnnect project	Bank Payment	BP-14	16,348.00	
31-3-2020	Dr 886 : Corporation Bank Being # 804366 Double entry reversed.	Bank Receipt	BR-7		2,200.00
Dr	<b>Closing Balance</b>			3,13,048.84	2,63,231.00
					49,817.84
				<b>3,13,048.84</b>	<b>3,13,048.84</b>



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