

**EXECUTIVE SUMMARY**  
**SLUM AREA REDEVELOPMENT**

**AT**

**C.T.S. NO. 8 (PT) OF VILLAGE  
PARIGHAKHADI, TAL – ANDHERI & C.T.S.  
NO. 577 (PT), 578, 579, 580 & 581 (PT) OF  
VILLAGE KURLA, NEAR KURLA COURT,  
L.B.S. MARG, KURLA (W), MUMBAI 400 070**

**BY**

**M/S. N.K.CONSTRUCTION WORKS**

## **1. INTRODUCTION TO PROJECT**

After recognizing the need of development of plot bearing C.T.S. No. 8 (PT) of village Parighakhadi, Tal – Andheri & C.T.S. No. 577 (PT), 578, 579, 580 & 581 (PT) of village Kurla, Near Kurla court, L.B.S. Marg, Kurla (W), Mumbai 400 070, fully affected by slums, M/s. N.K.Construction Works have proposed redevelopment of entire property under present “slum rehabilitation laws”. The parameters of the development will be as under.

<b>Buildings</b>	<b>Description</b>
<b>Rehabilitation &amp; Reservation</b>	
<b>Rehabilitation Building 1: 1 Bldg with 2 Wings: A &amp; B</b> Gr. (pt) + Stilt (pt) + 16 <sup>th</sup> upper floors	Flats: 180 Nos. Shops: 6 Nos. R/C: 2 Nos. Balwadi: 2 Nos. Welfare centre: 2 Nos. Society office: 2 Nos.
<b>Rehabilitation Building 2:1 Bldg with 3 Wings: A, B &amp; C:</b> Stilt + 16 <sup>th</sup> upper floors	Flats: 60 Nos. PAP: 64 Nos. R/C: 1 No. Balwadi: 2 Nos. Welfare Centre: 2 Nos. Society office: 1 No. Municipal Housing Flats: 53 Nos.
<b>Sale</b>	
<b>Sale Building1: 1 Bldg with 3 Wings: A, B &amp; C:</b> Basement + Gr. (pt) + Stilt (pt) + 1 <sup>st</sup> commercial floor + 2 <sup>nd</sup> to 3 <sup>rd</sup> podium + 4 <sup>th</sup> + 19 <sup>th</sup> (pt.) upper floors	Flats: 178 Nos. Shops: 15 Nos.
<b>Sale Building 2 :1 Bldg with 3 Wings: A, B &amp; C:</b> Basement + Stilt (pt) + 6 <sup>th</sup> upper floors	Flats: 41 Nos.

There are existing slums at site which will be demolished and plot will be developed as Residential development with shops. As per Annexure-II certified, there are total 426 no. of slum-dwellers on the

plot, out of which 251 nos have certified as eligible, 21 Nos. of hutments are still pending with the decision about the eligibility and 154 nos are ineligible. The users of existing slum structures are predominantly Residential with some are shops/commercial. The existing users are maintained in the proposed redevelopment and there is no change of use in the instant case.

The site under reference is **PARTLY** affected by **CRZ-II zone** of MITHI RIVER having tidal influence. The plot derives access from existing Lal Bahadur Shastri Road. Redevelopment of slums is permissible as per provisions of CRZ notification 2011, subject to prior permission from MCZMA.

The development site does not fall or contain the environmentally sensitive areas as specified in the coastal Regulation zone notification.

The total cost of the CRZ affected plot of the project is Rs. 46,51,95,183/- (Rupees Six Crores Fifty One Lakh Ninety Five Thousand One Hundred And Eighty Three Only) as per the valuation report carried by certified registered valuer.

## **2. PURPOSE OF THE REPORT**

Proposed redevelopment is on plot bearing C.T.S. No. 8 (PT) of village Parighakhadi, Tal – Andheri & C.T.S. No. 577 (PT), 578, 579, 580 & 581 (PT) of village Kurla, Near Kurla court, L.B.S. Marg, Kurla (W), Mumbai 400 070 and thereby to obtain Environmental CRZ Clearance. The Plot is occupied by a slums, which are now proposed to be redeveloped. As per MoEF Notification dated 6/1/2011.

Current development thus will help the existing slumdweller to get permanent, safe structure. At present they are residing in unsafe living conditions.

As the site under reference is affected by CRZ-II zone, it attracts the CRZ legislation as per 6<sup>th</sup> January 2011 notification for Coastal Regulation Zone (CRZ) and the regulating activities in the CRZ.

### **3. DESCRIPTION OF THE PROJECT**

#### **3.1 NATURE OF THE PROJECT**

This is a proposal for redevelopment of residential building situated at C.T.S. No. 8 (PT) of village Parighakhadi, Tal – Andheri & C.T.S. No. 577 (PT), 578, 579, 580 & 581 (PT) of village Kurla, Near Kurla court, L.B.S. Marg, Kurla (W), Mumbai 400 070 , in CRZ-II belt, as the same is situated within 500 mtr. from Mithi River.

The proposal is for redevelopment of slums, situated in residential zone.

As the plot is partly affected by CRZ, for NON\_CRZ portion of the plot, DCRs as on today have been applied. However, for the CRZ affected strip of the plot, admeasuring 6384.24 sq mtrs, as certified by IRS Chennai., FSI claimed is only 1.25, as permissible for slum redevelopment as on 19.2.1991.

#### **3.2 SIZE OF THE PROJECT**

**Total Area of the said plot is** 10,640.40 Sq. mt. out of which 6384.24 sq.mtr. plot area is affected by CRZ II area of the Mithi River.

#### **3.3 LOCATION**

The C.T.S. No. 8 (PT) of village Parighakhadi, Tal – Andheri & C.T.S. No. 577 (PT), 578, 579, 580 & 581 (PT) of village Kurla, Near Kurla court, L.B.S. Marg, Kurla (W), Mumbai is in

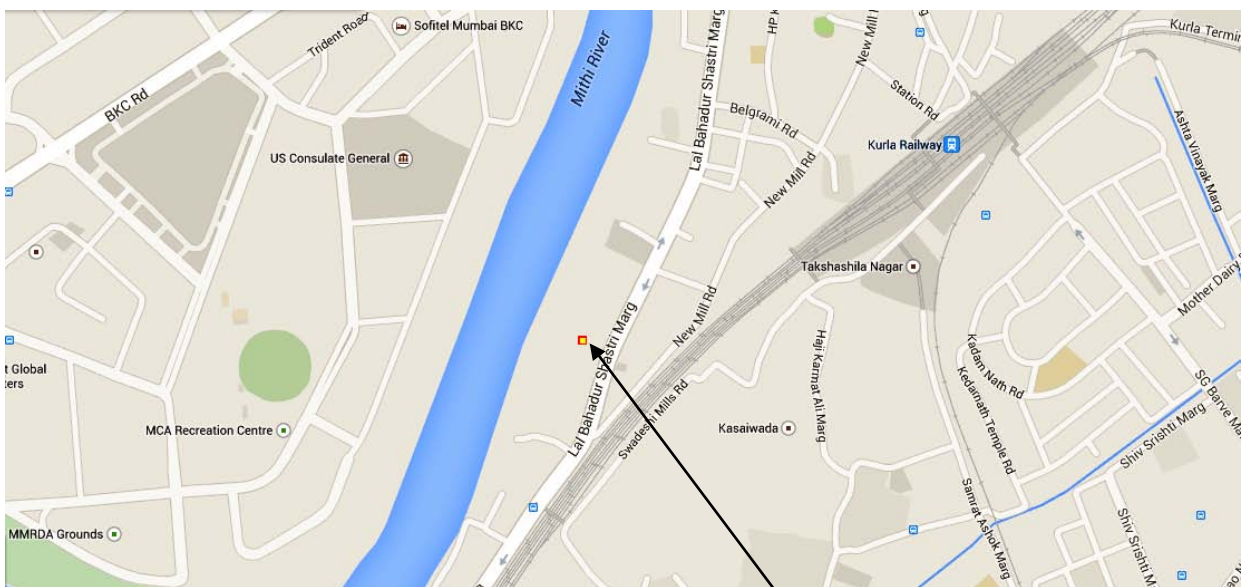
the suburban part of the city. The nearest railway station is Kurla Railway Station, 1.00 Km from the site, on the central line. The nearest bus stop is Chunnabhatti bus stop, which is 1.50 kilometers away from the site.

Google Earth Image of the site



SITE UNDER REFERENCE

Location Map of the reference plot



SITE UNDER REFERENCE

### 3.4 SITE DESCRIPTION

The site under reference is partly affected by CRZ-II zone and the property abuts the existing Lal Bahadur Shastri Marg. Thus property attracts the CRZ legislation as per CRZ 2011.

The development site does not fall or contain the environmentally sensitive areas as specified in the coastal Regulation zone notification. Total plot Area is 10,640.40 Sq. mt. sq. mtr.

Town / Tehsil	:	Mumbai
District	:	Greater Mumbai
State	:	Maharashtra
Latitude	:	19° 03'44.11"N
Longitude	:	72°52'20.64"E

**3.5 PROPOSED DEVELOPMENT****3.5.1 AREA**

Sr. No.	Particulars	Scheme Area in CRZ II	Scheme area in NON CRZ		Total area in sq. mtrs.
			Slum Area	Non Slum Area	
1	Plot Area of the Scheme	<b>6384.24</b>	<b>4275.66</b>	<b>297.5</b>	<b>1097.4</b>
2	Deduction for setback of road already merged with LBS Road	<b>0</b>	<b>317</b>	<b>0</b>	<b>317</b>
3	Plot Area considered for the scheme	<b>6384.24</b>	<b>3958.66</b>	<b>297.5</b>	<b>10640.4</b>
4	Deductions for				
A	Road set back to be developed	<b>0</b>	<b>120.35</b>	<b>0</b>	<b>120.35</b>
5	Net Area of the plot	<b>6384.24</b>	<b>3838.31</b>	<b>297.5</b>	<b>10520.05</b>
6	Less 15% Recreation/Amenity space	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
7	Balance Plot Area	<b>6384.24</b>	<b>3838.31</b>	<b>297.5</b>	<b>10520.05</b>
8	Add. For FSI Purpose				
8a	Road Set back Area	<b>0</b>	<b>120.35</b>	<b>0</b>	<b>120.35</b>
9	Total plot area for FSI	<b>6384.24</b>	<b>3958.66</b>	<b>297.5</b>	<b>10640.4</b>
10	Maximum Permissible FSI on plot	<b>1.25</b>	<b>3</b>	<b>1</b>	
11	Maximum Permissible BUA on plot (=9 x 10)	<b>7980.3</b>	<b>11875.98</b>	<b>297.5</b>	<b>20153.78</b>
12	Proposed Rehab BUA	<b>4401.93</b>	<b>5354.61</b>	<b>0</b>	<b>9756.54</b>
13	Proposed area for amenities and passages	<b>979.02</b>	<b>1332.52</b>	<b>0</b>	<b>2311.54</b>
14	Rehab Component Proposed (+12 + 13)	<b>5380.95</b>	<b>6687.13</b>	<b>0</b>	<b>12068.08</b>
15	Permissible Sale Component in the scheme	<b>5380.95</b>	<b>6687.13</b>	<b>0</b>	<b>12068.08</b>

16	Total BUA of approved for the scheme (12+15)	<b>9782.88</b>	<b>12041.74</b>	<b>297.5</b>	<b>22122.12</b>
17	Total FSI Sanctioned for the Scheme (17/10)	<b>1.532</b>	<b>3.04</b>	<b>1</b>	
18	Rehab Component proposed In situ	<b>5984.03</b>	<b>3772.51</b>	<b>0</b>	<b>9756.54</b>
19	Sale BUA Component proposed In situ	<b>1996.27</b>	<b>8103.47</b>	<b>297.5</b>	<b>10062.29</b>
20	Total BUA Component proposed In situ	<b>7980.3</b>	<b>11875.98</b>	<b>297.5</b>	<b>20153.78</b>
21	Total FSI consumed in the Scheme IN SITU	<b>1.25</b>	<b>3</b>	<b>1</b>	
22	No. of Slum Dwellers to be accomodated-				
	a) Rehab Resi.-	<b>136</b>	<b>104</b>	<b>0</b>	<b>240</b>
	b) Rehab R/C-	<b>1</b>	<b>2</b>	<b>0</b>	<b>3</b>
	c)Rehab Commercial	<b>1</b>	<b>5</b>	<b>0</b>	<b>6</b>
23	No. of Regular PAP to be accomodated	<b>0</b>	<b>64</b>	<b>0</b>	<b>64</b>
24	Amenities to be provided				
	a)Balwadi	<b>2</b>	<b>2</b>		<b>4</b>
	b)Welfare Centre	<b>2</b>	<b>2</b>		<b>4</b>
	c)Society office	<b>1</b>	<b>2</b>		<b>3</b>
25	Reservations to be developed and handed over to MCGM				
	i)Road Setback	<b>0</b>	<b>437.35</b>	<b>0</b>	<b>437.35</b>
	ii)Road Depot (Open Plot Area)	<b>0</b>	<b>0</b>	<b>297.5</b>	<b>297.5</b>
	iii)Substation (BUA)	<b>0</b>	<b>561.74</b>	<b>0</b>	<b>561.5</b>
	iv)Municipal Housing (BUA)	<b>0</b>	<b>1578</b>	<b>0</b>	<b>1578</b>
26	TDR generated if any				<b>1968.34</b>



**PROJECT DEVELOPMENT DETAILS**

Proposed development					
1	Structure of Building	<b>Buildings</b>		<b>Description</b>	
		<b>Rehabilitation &amp; Reservation</b>			
		<b>Rehabilitation Building 1: 1 Bldg with 2 Wings: A &amp; B</b> Gr. (pt) + Stilt (pt) + 16 <sup>th</sup> upper floors		Flats: 180 Nos. Shops: 6 Nos. R/C: 2 Nos. Balwadi: 2 Nos. Welfare centre: 2 Nos. Society office: 2 Nos.	
		<b>Rehabilitation Building 2: 1 Bldg with 3 Wings: A, B &amp; C:</b> Stilt + 16 <sup>th</sup> upper floors		Flats: 60 Nos. PAP: 64 Nos. R/C: 1 No. Balwadi: 2 Nos. Welfare Centre: 2 Nos. Society office: 1 No. Municipal Housing Flats: 53 Nos.	
		<b>Sale</b>			
		<b>Sale Building 1: 1 Bldg with 3 Wings: A, B &amp; C:</b> Basement + Gr. (pt) + Stilt (pt) + 1 <sup>st</sup> commercial floor + 2 <sup>nd</sup> to 3 <sup>rd</sup> podium + 4 <sup>th</sup> + 19 <sup>th</sup> (pt.) upper floors		Flats: 178 Nos. Shops: 15 Nos.	
		<b>Sale Building 2 : 1 Bldg with 3 Wings: A, B &amp; C:</b> Basement + Stilt (pt) + 6 <sup>th</sup> upper floors		Flats: 41 Nos.	
2	Tenements existing	426 tenements.			
3	Tenements proposed	<b>Sr.No.</b>	<b>Type of Accommodation</b>	<b>Nos.</b>	
		1.	Residential	512	
		2.	PAP	64	
		3.	R/C	3	
		4.	Balwadi	4	
		5.	Welfare Centre	4	
		6.	Society office	3	
		7.	Shops	21	
4	Salient features of the project	<ul style="list-style-type: none"> <li>• Earthquake Resistance Building structure</li> <li>• Rain water Harvesting System in the complex</li> <li>• Energy Conservation; Provision of Solar water heating system.</li> </ul>			

	<ul style="list-style-type: none"> <li>• Eco-Friendly Measures</li> <li>• Optimum use of Timber</li> </ul>
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### 3.5.2 UTILITIES

The Utilities required during the construction phase area water, power, fuel and Labour.

#### i) WATER:

##### During Construction Phase

(Expected Consumption – total 20-30 cum/day)

- From M.C.G.M.: 12 KLD.( For workers)
- From Water tankers: 10 – 20 KLD. (Depending on construction activity)

##### During Operational Phase:

#### ➤ Water Consumption: (Domestic and flushing requirement)

Sr. No.	Buildings	Occupancy	Total Water Requirement (KLD)		
			Domestic	Flushing	Total
1	Rehabilitation 1 & 2	1628	140	71	211
2	Municipal Housing	265	24	12	36
3	Sale	1140	99	50	150
	<b>Total</b>	<b>3033</b>	<b>263</b>	<b>133</b>	<b>397</b>

**Reference:** Criteria for water requirement: National Building Code (NBC) -2005 –

Part 9, Page 19, Water Requirement

The amount of water demand is calculated based on the occupancy of the building and the per capita consumption as given in MoEF-Manual on norms and standards for EC of large construction projects i.e. Total quantity of water used (LPCD) = Occupancy x Quantity (LPCD) .Then Total quantity of water used for Domestic and Flushing in KLD is calculated.

➤ **Total water requirement for the project and source:**

<b>Sr. No.</b>	<b>Description</b>	<b>Quantity of water required (KLD)</b>	<b>Source of water supply</b>
<b>1.</b>	<b>Construction phase</b>		
a.	For Workers	12 KLD	M.C.G.M.
b.	For Construction	10 - 20 KLD (Depending upon the construction activity)	Water tankers
<b>2.</b>	<b>Operation phase</b>		
			<b>Source of water supply</b>
a.	Domestic	263	M.C.G.M.
b.	Flushing	133	Treated sewage from STP
c.	Gardening	9	Treated sewage from STP

\*Water requirement for gardening purpose is considered as 7 liters per square meter of gardening area on ground

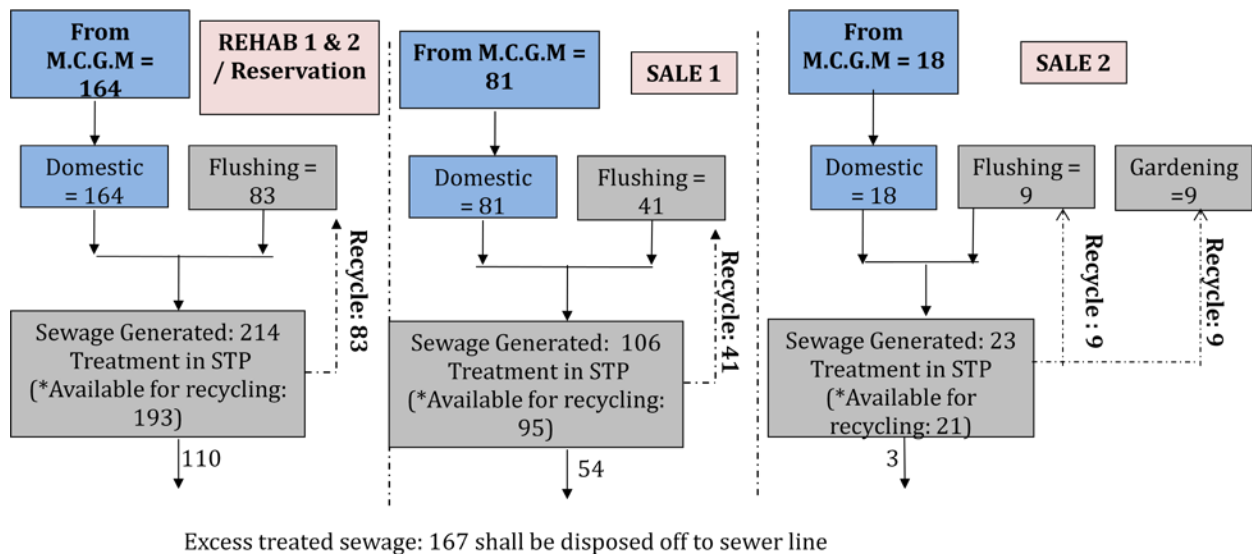
Total quantity of water used (LPCD) =Gardening Area (Sq. Mt.) x Quantity (Lit /Sq. Mt.)

Then Total quantity of water for gardening in KLD is calculated.

**Sewage Generation**

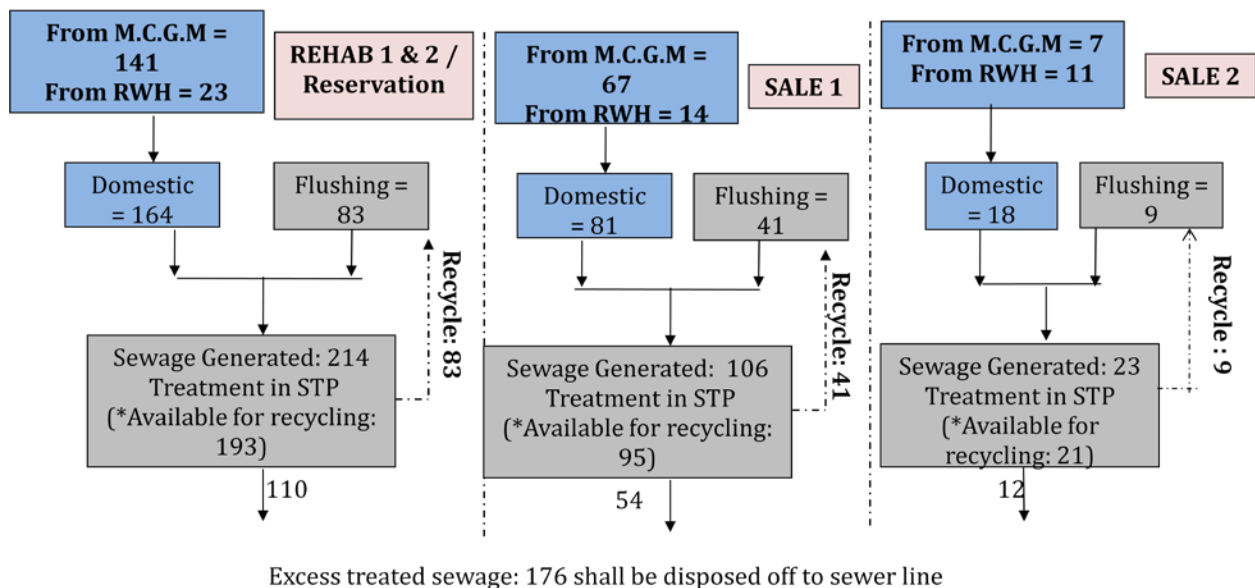
Sr. No	Description	Quantity of Sewage generated (KLD)	Treatment/ Disposal
1.	Construction Phase	11	The sewage generated will be disposed to existing municipal sewer line.
2.	Operation Phase	343	Treatment in STP and reuse of treated sewage (available for recycling 309 KLD) for flushing (133 KLD) and gardening (9 KLD). Excess treated sewage i.e., 167 KLD during non-monsoon season and 176 KLD during monsoon season will be disposed to existing sewer line. The dried sludge will be used as manure.

**Reference:** Criteria for sewage: Manual on norms and standards for EC of large construction projects – MoEF.

**WATER BALANCE PER DAY BASIS FOR NON-MONSOON SEASON**

**\* Please Note:**

- We have considered 10 % less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation.
- Total water requirement = 405
- Treated sewage available for recycling = 309
- After recycling treated sewage for gardening (9), flushing (133)
- Net water requirement = 263 [ From M.C.G.M]
- **Reduction in water Demand = 35%**
- All quantities are in KLD

**WATER BALANCE PER DAY BASIS FOR MONSOON SEASON**

**\* Please Note:**

We have considered 10 % less availability of sewage for recycling considering losses of sewage in evaporation and sludge formation.

- Total water requirement = 396
- Treated sewage available for recycling = 309
- After recycling treated sewage for flushing (133)
- From RWH Tank: 48 (For Domestic)
- Hence Net water requirement = 215 from M.C.G.M.
- **Reduction in water Demand = 46**
- All quantities are in KLD

**Design Basis of Treatment plant – MBBR (Moving Bed Bio Reactor)**

Table No.13: Untreated &amp; Treated Sewage Quality

SR. NO.	DETAILS	VALUES		UNITS
		UNTREATED	TREATED	
1.	pH	7.0 – 8.0	6.5 – 7.5	
2.	Total Suspended solids	250	<10	mg/lit
3.	Chemical Oxygen Demand	400	<30	mg/lit
4.	BOD, 3 day, 27 °C	250	<10	mg/lit
5.	Oil & Grease	50	<5	mg/lit

**Design Basis of Treatment plant – MBBR (Moving Bed Bio Reactor)**

The treatment will include the following unit / equipment;

- Screen Chamber
- Oil & Grease Trap
- Raw Sewage Collection Tank
- Raw Sewage Transfer pumps

All the sewage generated will gravitate through Bar Screen. The Bar screen will take care of any floatable matter, which will be manually scrapped out and collected in drums. Bar screen will comprise of SS plate type screen for removing floatable matter. From the bar screen it will then pass on to the Oil & Grease Trap for removal of free floating oil. The oil will be scrapped and collected in drums to be disposed as per statutory norms. The sewage will be collected in raw collection tank. Uniform mixing is achieved by providing aeration grid (air sparing) in the collection tank. After completion of mixing, the sewage will be pumped at a uniform rate by sewage transfer pumps to Biological Treatment.

**Biological Treatment (Secondary Treatment):**

**This will include the following;**

- MBBR Bioreactor
- Secondary Clarifier
- Sludge Dewatering System-(Filter press)

The process will be of activated sludge extended aeration biological process of Moving Bed Bio Reactor (MBBR) type.

The MBBR process will be an aerobic system having two biological growth process- attached growth and suspended growth. The pretreated sewage from raw sewage collection tank will be pumped into MBBR where support media will provide more surface area for Biological growth. Oxygen will be added for biological growth through tubular diffusers.

The effluent will be uniformly pumped to MBBR Reactor to biologically degrade the organic matter. The oxygen required for the bacterial growth will be supplied through Diffuser systems. The system envisages better oxygen transfer because of fine bubbles and increased contact with the sewage.

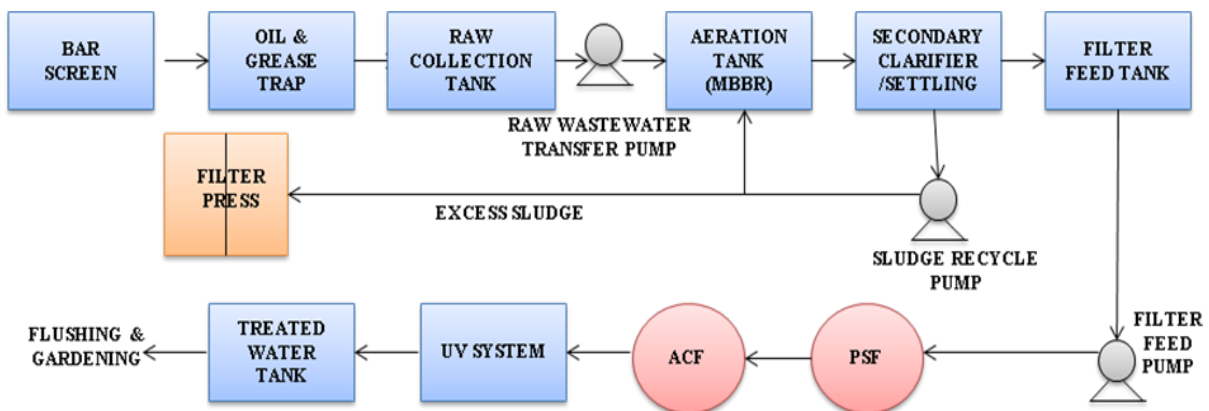
The overflow from MBBR Reactor will gravitate to the Secondary clarifier. The arrested sludge will be pumped back to the Aeration tank to maintain the bacterial concentration in the tank and excess sludge will be sent to the Sludge collection pit and shall be dewatered using a Filter press. The filtrate will be taken to the Raw Sewage Collection Tank. The dried sludge can be used as manure for gardening.

**Tertiary Treatment:**

The treatment will include the following unit / equipment;

- Filter feed tank
- Pressure Sand Filter (PSF)
- Activated Carbon Filter (ACF)
- UV system

The clear supernatant from the Secondary clarifier will be collected in a Filter feed tank. This tank will be provided with level switch for unmanned operations. The treated sewage will be pumped to PSF followed by ACF. After ACF treated sewage will be passed through UV filtration for disinfection. After UV filtration treated sewage will be collected in Treated Water Tank. Treated sewage from Treated Water Tank can be used for secondary requirement.



ii) **POWER**

**DURING CONSTRUCTION**

- ✓ During Construction Phase -
  - a. Local Authority: 100 KW
  - b. D.G. Sets: As per requirement



**DURING OPERATION**

Source: Local Authority

✓ **Power Requirement**

Connected load	4696 KW
Maximum demand	3052 KW
D.G sets (In case of power failure)	3 D.G set of 100 kVA each

**iii) FUEL****DURING CONSTRUCTION PHASE**

Diesel (5 L/day during excavation & 10 L/day post excavation).

All the equipment are electrically driven except JCB, porcelain, and concrete mixers.

**DURING OPERATION PHASE**

Diesel will be required to run the D. G. Set in case of power failure. Hence the quantity of diesel consumed will vary depending upon the usage of D. G set.

1. Storage: Diesel and oil will be stored in drums / tins with proper identification mark/labels in identified areas only.
2. Fire and safety measures will be taken as per the guidelines from concerned authority.
3. All Safety and fire precautions will be followed.

**iv) MANPOWER****DURING CONSTRUCTION PHASE**

(Expected Manpower – about 50)

Approximately 50 persons will be working during the peak time of construction phase. These persons will be on the project site during 0900 hrs. Except Security Personnel, who will be on the field round the clock for twenty – four hours.

## **DURING OPERATION PHASE**

### **POPULATION**

There will be about 2295 persons residing in the building, 738 persons will be non residential staff including drivers, security personals population in the building.

## **4. CONSTRUCTION PHASE**

The type of Construction Materials, Equipments used during the construction phase and persons involved in various activities on the field affect the status of environment to a great extent. The impact of construction activities on various components of environment on the on the project site and surrounding area is predicated in this section.

### **4.1 LIST OF MATERIALS**

The approximate construction material required for the proposed redevelopment is given below.

Sr. No.	Item	Unit	Quantity	Source	Process
1.	Sand	CUM	12055.00	River bed	Nil
2.	Aggregate	CUM	26808.00	Quarry	Crushing

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3.	Standard Bricks	Nos.	9703	Red Soil	Heating, Moulding
4.	Timber	M.T	440	Forest	Cutting & Trimming
5.	Construction Waste	Kg/ Day	827	-	-

- The basic engineering materials like aggregate, cement, sand and bricks/blocks will be purchased locally. However, finishing materials will be purchased keeping in mind the energy conservation aspect.

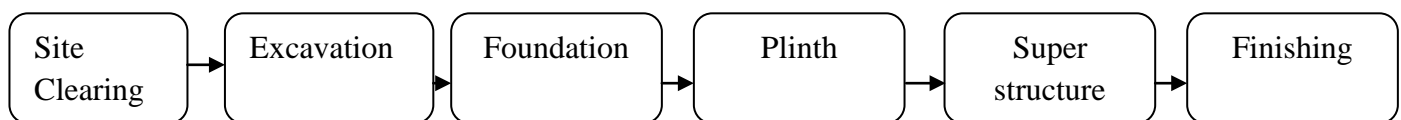
## 4.2 LIST OF EQUIPMENTS

The construction equipments required for the residential building is given below.

Sr. No.	Equipments	Numbers	Operation	Duration
1.	JSB,Poclaim	1	Diesel	Short
2.	Dumpers	2	Diesel	Short
3.	Goods lifts / Personal lifts	1	Electric	Total
4.	Vibrators	4	Electric	Total
5.	Dewatering Pumps	1	Electric	Total
6.	Concrete Mixers	1	Electric	Total
7.	Wood Cutting Machine	1	Electric	Total
8.	Drill Machine	1	Electric	Total

## 4.3 CONSTRUCTION PROCEDURES

The outline of the construction procedure is described below schematically.



**Note:**

- 1] The project is expected to be completed within Five years (Maximum) period Construction Parameters and Quality will be strictly adhered to as per the approved architectural design data/map. All the regulations of government authorities will be followed.
- 2] All the safely precaution will be observed as per the guidelines during the construction phase. Personal Protective Equipments (PPE) will be provided to all the personnel involved in the construction activities.
- 3] Site barricading by corrugated tin sheets up to height of 5.0 mtrs will be done to protect the surrounding area of the project site from nuisance /dusting.
- 4] All electrical connections & cables will be checked by authorized persons to ensure the safety of workers on field.
- 5] Water sprinkling will be done, wherever required to reduce the dusting in atmosphere. Jute barricading along building / plot boundary shall be provided to minimize noise level from construction activities.
- 6] The safety and security officers shall supervise the site.
- 7] Safety helmets will be mandatory to all the persons present on the site during the construction activities.
- 8] Hand gloves and dust masks will be provided to persons handling construction materials during the operation.
- 9] Safety belts will be provided to the persons working at height during the operation.
- 10] Safety nets will be arranged at a height at about 5.0mtr.when the structures get raised above the required height from the ground.

## **5. ENVIRONMENTAL CONCERNS**

### **5.1 AIR POLLUTION**

1] Source: - The source of Air Emissions is from the use of some equipment like concrete pumps, mixers, etc. These equipments consume Diesel as fuel during their operation. Carbon Monoxide, Hydrocarbons, Oxides of Nitrogen and Particulate Matter etc. will be the major pollutants.

Fugitive Emissions i.e. Emissions from construction activities will mainly consist of dust. Movement of Heavy & light vehicles, for loading and unloading of Construction Materials, transporting people, will also add on to source of emissions.

Parameter	Permissible Range	CPCB Limits	AVG Range Before Activity	During Activity
SPM ( $\mu\text{g}/\text{m}^3$ )	100 ~ 200	200	80-100	150-200
RSPM ( $\mu\text{g}/\text{m}^3$ )	50 ~ 100	100	20-30	50-100
SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	50 ~ 80	80	10-15	10-15
NO <sub>x</sub> ( $\mu\text{g}/\text{m}^3$ )	40 ~ 80	80	5-10	5-10

Ref: 24 Hourly values as per Central Pollution Control Board, National Ambient Air Quality Monitoring, Notification 11<sup>th</sup> April, 1994, Schedule 1.

## 5.2 AIR POLLUTION MITIGATION

Sr. No.	Source	Mitigation	
1.	Vehicle	i]	All the vehicles coming to the site will be ensured to be in good condition having PUC.
		ii]	Public awareness to use Green Fuel will be done.
2.	Solid Waste	i]	Proper segregation and collection of waste will be ensured.
		ii]	Location of loading and unloading will be fixed.
		iii]	Good Housekeeping practices will be ensured at the premises.
3.	Construction Activities	i]	Noise / Dust nuisance preventions by barricading site up to 5.0 meter height by GI Sheets
		ii]	Water sprinkling on dry site, sand.
		iii]	Maximum use of electrical driven construction equipments with regular maintenance.

### AVERAGE AMBIENT AIR QUALITY AT THE PROJECT SITE

Period: May 2014

#### Average Ambient Air Quality at the Project Site

Monitoring Station	RSPM µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	NO <sub>x</sub> µg/m <sup>3</sup>
Base station: Project Site	52.0	15.0	12.0

During construction phase, Dust, Particulate Matter is the main pollutant, which may be generated during construction activities. Other emission sources are intermittent and include emissions of SO<sub>2</sub> NO<sub>x</sub> and CO from materials transport of heavy vehicles on site etc. Proper upkeep and maintenance of vehicles, sprinkling of water on roads and construction site are some of the measures that would reduce the impact during construction phase.

#### Sources of Air pollution During Operational phase :

- The gaseous emissions from vehicles
- Emissions from DG sets while in operation only during power failure

#### Mitigation Measures:

- The traffic congestion will be avoided by proper parking arrangement and maintaining smooth traffic flow.
- Regular PUC checkup for vehicles
- CPCB approved DG sets only will be used.
- Proper maintenance of DG sets shall be done and Low sulphur fuel shall be used.

#### AVERAGE/ MAXIMUM AND MINIMUM METEOROLOGICAL DATA

##### Period: Year 2013

Study period	Temp (°C)		Predominant Wind direction	Wind speed (km/h)		Relative Humidity (%)	
	Max.	Min		Max	Min	Max	Min.
January	34.8	11.7	North West	18	0	96	11
February	36.5	14.7	North	26	0	93	16
March	41	18.7	North West	26	0	92	16
April	37.1	19.7	North West	22	0	92	25
May	34.4	25.6	West	22	0	95	35
June	33.9	24.8	South West	26	0	98	54
July	31.7	24	West	26	0	100	68
August	31.3	24.4	West	26	0	93	49
September	32.4	22.8	West	26	0	100	60
October	36.8	21.2	West	22	0	96	36
November	37	18.2	North West	12	0	91	23
December	35.2	15	North West	12	0	94	15

Source: As per IMD (Indian Meteorological Data), 2013 being a nearest base station.



### 5.3 WATER POLLUTION

1] **Use:** - The MCGM water will be used for domestic purpose i.e. drinking water for staff and laborers working on the field whereas bore well water/tanker water will be used for various constructions activities like, Concreting, Plastering , Flooring & Finishing etc.

2] **Effluent:** - There will be no generation of effluent from construction activities as the water used for concreting; Plastering, Flooring and Finishing etc. will get evaporated during drying or curing time. All the construction activities are physical in nature. The domestic effluent will be generated due to the persons working on the site who will require water for drinking, cleaning, bathing etc.

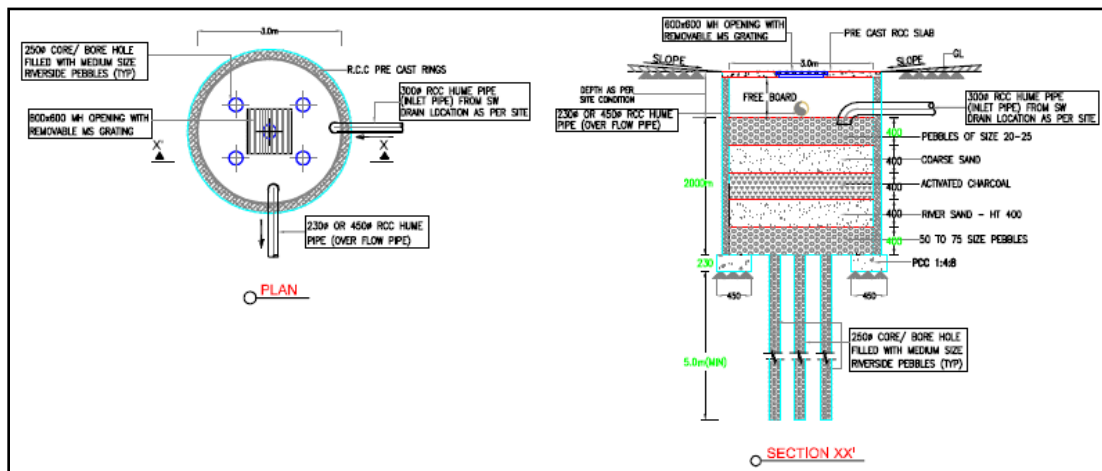
Sewage generated during operation phase will amount to 343 CMD which will be treated in the Sewage Treatment Plant. The treated water will be used for non domestic purposes such as gardening, flushing etc.

3] **Treatment & Disposal:-** The Domestic Effluent generated in construction phase will be disposed off in existing MCGM Sewer.

4] **Rain Water Harvesting:-** The plot area considered for development of slums is 9895.34 sq mtrs,. Rain water harvesting is proposed in the project. The permeable paver blocks are proposed along with Recharge pits to increase the percolation of rain water into the soil rather than flowing to the drain.

**\* (AS PER MOEF GUIDELINES)**

- **Percolation Pits: 1 nos. (0.5 \* 0.5 \* 2m)**



### 5] Storm Water Discharge:

Storm water drains will be constructed for proposed facility as per the norms. The recharge pits and Rain water recharge pits will help to reduce the run off and reduce the load on external storm water drain.

Total Runoff from the project site: Prior to Development = 0.45 m<sup>3</sup>/sec

Total Runoff from the project site: After Development = 0.47 m<sup>3</sup>/sec

(Considering different coefficients for paved area, unpaved area and terrace)

Hence Incremental Run off = 0.47 – 0.45 = 0.02 m<sup>3</sup>/sec

Capacity of storm water drains is sufficient to take the runoff from the site.

Management plan for Flood is as follows :

- Storm water drain shall be cleaned at regular interval.
- Mapping the areas within or leading in or out of the building that will be water logged, flooded or isolated due to the flood. The areas will be marked after completion of the project

Sump pump shall be installed at vulnerable location at basements to avoid flooding

**5.4 NOISE POLLUTION**

Location	Range    dB (A)
	Day Time
National Ambient Air Quality Standards (For Residential Zone)	55

### 5.5 NOISE LEVEL MITIGATION

Sr. No.	Source	Mitigation
1.	Near Residential Areas	i] Site Barricading by corrugated tin sheets will be done to protect the surrounding area. ii) Construction Activity will be carried out during daytime only.
2.	Nearby Traffic	i] All the vehicles coming to the site will be ensured in good condition, having Pollution Under Check (PUC). ii] Smooth Roads will be maintained in a project site.
3.	Construction Equipments	i] All the equipments will be run during daytime only. ii] Lubricants will be applied to all the equipments at proper interval. Iii] Acoustic Enclosure will be provided for all the Equipments

The proposed project being Rehabilitation project i.e. residential development with shops, the source of noise is mainly vehicular noise. The project proponents have proposed to provide well organized parking arrangement and maintaining smooth traffic flow which would help in reducing traffic congestion and noise levels. Trees would act as noise barrier and will reduce the noise level. There were no existing trees on site. Total 176 Nos. of trees shall be planted on the ground. Plantation of trees would act as noise barrier and will reduce the noise level.

D.G. Sets will be operated only in case of power failures during operational phase. The Pollutants like SPM, SO<sub>2</sub> that may arise from emissions from D.G. Sets will be discharged through vent of proper height. D.G. sets are with inbuilt acoustic enclosures to reduce the noise of D.G. sets while in operation.

2] It is evident from the nature of operation (i.e. Construction) that the Concentration of suspended particulate matter would be higher than the other two parameters.

3] Control of Emission: - Proper precaution will be taken to reduce the particulate matter by water sprinkling on the dry site area, barricading the periphery by corrugated tin Sheets of 5.0 mtrs height to protect the surrounding area from dusting. The pollution generated will be controlled by, allowing vehicles that will comply to mass Emission Standard (Bharat Stage –II) stipulated by Central Pollution Control Board (CPCB)–Ministry of Environment & forest (MoEF), New Delhi. Also it will be ensured that the vehicles will carry PUC certificate. To minimize air pollution efforts shall be made by use of equipments, which are electric power driven.

## 5.6 SOLID WASTE

### ❖ During Construction Phase

No. of workers	Criteria for Solid Waste Generation			Solid Waste Generation (Kg /day)		
	Total (Kg/Person/day)	Non-Biodegradable	Biodegradable	Non-Biodegradable	Biodegradable	Total
150	0.1	80%	20%	12	3	15

The solid waste generation due to workers dwelling on the site will be segregated and will be disposed suitably.

**During Operation Phase:**

Sr. No	Buildings	Occupancy	Solid Waste Generation (Kg/day)		
			Non Biodegradable	Biodegradable	Total
1	Rehabilitation 1 & 2	1628	210	491	701
2	Municipal Housing	265	36	83	119
3	Sale	1140	152	346	498
	<b>Total</b>	<b>3033</b>	<b>398</b>	<b>920</b>	<b>1318</b>

**Considerations for solid waste generation:**

- For Residential/PAP/R/c:70 % wet garbage and 30 % dry garbage out of total 0.45 Kg/person /day
- For Shops: 20 % wet garbage and 80 % dry garbage out of total 0.1 Kg/person /day
- For Balwadi/Welfare centre/Society office: 80 % wet garbage and 20 % dry garbage out of total 0.1 Kg/person /day.

The total quantity of solid waste is expected at 1318 kg/day. Out of which 398 kg/day will be non-biodegradable and 920 kg/day will be biodegradable.

- Segregation of non biodegradable and biodegradable garbage on site.
- Bio degradable garbage: Treatment in OWC (Organic Waste Convertor)
- Non- biodegradable garbage: Segregated into recyclable and non-recyclable waste.
- Recyclable waste: Handed over to recyclers
- Non-recyclable waste: Handed over to M.C.G.M.

- STP Sludge (Dry sludge): Used as manure within the premises for plants.
- Normal debris, waste concrete, soil, broken bricks, waste plasters etc. will be collected properly and will be reused for land filling in the premises.

## **6. PROJECT SCHEDULE AND COST ESTIMATES**

The Proposed Project is Redevelopment project and will be started as soon as all government NOC's and CRZ Clearance is received to start the work. The projected Date of Start is December 2015 while the date of completion will be December 2020 if everything went as per planning.

## **7. TRAFFIC MANAGEMENT**

### **7.1 CONSTRUCTION PHASE**

- Storage and Godown area will be properly identified.
- There will be about adequate wider space for movements of vehicles and parking.
- The area for loading and unloading will be located at proper demarcated location in the premises.
- Thus the traffic management on the project site will be easily and smoothly monitored without any hindrance to the regular flow of traffic on the main road.

### **7.2 OPERATIONAL PHASE**

- About 190 cars per day are expected to be accommodated in the premises. The parking space will be provided in basement and under stilt / parking floors. There is ample car parking space in the building on all sides; there will be smooth movements of cars.
- There will be 6.0 mtrs wide approach road to the building from municipal road for movements of vehicles and parking.

- Traffic Management Plan system will be approved from concern MCGM Authority.
- Thus the traffic management will be easily and smoothly monitored without any hindrance to the regular flow of traffic on the main road.

## **8. ENVIRONMENTAL, HEALTH AND SAFETY**

All the safety and security measures shall be observed at constructions site. Safety precautions will be observed as per the guidelines during the construction phase. Personal Protective Equipments (PPE) will be provided to all the personnel involved in the construction activities. The project authorities will ensure use of safety equipments for workers during execution process. The safety and security officers shall supervise the site. Proper training will be given to workers and authorities to handle the hazard situation.

### **8.1 SAFETY MEASURES ON SITE**

- 1] Parameters and Quality will be strictly adhered to as per the approved architectural design data/map. All the regulations of government authorities will be followed.
- 2] All the safely precaution will be observed as per the guidelines during the construction phase. Personal Protective Equipments (PPE) will be provided to all the personnel involved in the construction activities.
- 3] Site barricading by corrugated tin sheets up to height of 5.0mtr will be done to protect the surrounding area of the project site from nuisance /dusting.
- 4] All electrical connections & cables will be checked by authorized persons to ensure the safety of workers on field.
- 5] Water sprinkling will be done, wherever required to reduce the dusting in atmosphere. Jute barricading along building / plot boundary shall be provided to minimize noise level from construction activities.



- 6] The safety and security officers shall supervise the site.
- 7] Safety helmets will be mandatory to all the persons present on the site during the construction activities
- 8] Hand gloves and dust masks will be provided to persons handling construction materials during the operation.
- 9] Safety belts will be provided to the persons working at height during the operation.
- 10] Safety nets will be arranged at a height at about 5.0 mtrs when the structures get raised above the required height from the ground.

## **9. BENEFITS OF THE PROJECT**

- The proposed redevelopment will initiate redevelopment of surrounding old building.
- The surrounding area will also be developed from residential point of view.
- It will provide employment opportunities to the local people in terms of labour during construction and services personnel during operational phase.
- Modern sanitation and infrastructure facilities will have minimal impact on living condition of local people.
- The project will improve living standard and welfare of the area and local people.

SEISMIC ZONE MAP OF INDIA

