

Maximum pollution load was noted at P1 sampling, where BOD and COD loading are 6.15 t/day and 42.58 t/day respectively. This sampling site receives the maximum pollution load of Hayatabad. The second highest pollution load location in terms of BOD and COD is P6 (effluents coming from domestic sewage disposal plant). Here the BOD and COD loading are 4.68 t/day and 17.73 t/day respectively. This Treatment Plant is non-operational since 1996. Therefore domestic sewage without any treatment as such are being disposed off from this Plant. That's why the BOD and COD loading are very high.

The third highest pollution loads locations are P2 and P3. The BOD and COD loadings at sampling points P2 and P3 are 1.56 t/day and 12.57 t/day, 1.93 t/day and 12.04 t/day respectively. At both these locations the pollution loads are more or less the same.

Same pollution load was noted at sampling point P7, which is next to the solid waste dumping site. Comparative high BOD and COD loadings at P7 site with P4 and P5 sampling sites are due to the mixing of leachate coming from the solid waste dumping site.

3- Sewage Treatment Plant in Hayatabad

3-1 Existing System

The Peshawar Development Authority had laid sewerage network for all the Phases of Hayatabad Township. The sewerage network for Phase I to V were constructed to carry the sewage from these Phase upto the site of Sewage Treatment Plant constructed in Phase-III ranging in diameters from 6 to 24 inches. This Sewage Treatment Plant was constructed initially for treatment of 1.2 MGD (Million Gallons per Day) of sewage from the initial development of population from first five Phases to be extended for an ultimate capacity of 4.0 MGD.

The development in first five Phases had occurred at an accelerated rate resulting in increased population, increased quantity of sewage production and over loading of the Sewage Treatment Plant, which was not extended by Peshawar Development Authority. The development works of Phase-VI and VII had lagged. However, the sewerage networks for Phase-VI and VII were constructed but due to problem of pollution encountered at the previous Sewage Treatment Plant, the proposed Sewage Treatment Plant for Phases-VI and VII was constructed. The Sewage from the population in Phase-VI and VII entering into the sewerage network is at present flowing into the adjacent natural storm water nallah without treatment and is a source of pollution and environmental hazard for the surrounding areas.

3-2 Deficiencies of Existing Sewage Treatment Plant

As already explained, the existing Sewage Treatments Plant had been working over loaded due to increased flow of raw sewage over and above the designed capacity and is causing environmental pollution in the adjoining areas. Foul smell is being emitted from the Sewage Treatment Plant and is disturbing the traffic on adjacent main roads.

The defused aeration could not be done due to damage to machinery. This plant had been operating for about 15 years without adequate maintenance and operation. There is no record of the testing of raw sewage or treated effluent. The flow measuring equipment has worn out and damaged and not working since unknown period. There is no record of flow measurements ever carried out for this plant. It is therefore not possible to comment on the performance of this Sewage Treatment Plant even during the initial stages of construction and commissioning as no design report or detail construction drawings for this Sewage Treatment Plant are available. No records of analysis of raw sewage or treated effluent are available with Peshawar Development Authority. As such the extent of treatment achieved in this plant during initial stages or thereafter cannot be commented upon.

3-3 Present Situation

The present Sewage Treatment Plant at Hayatabad located on main road in Phase- III is causing environmental problem in the adjoining areas with foul smell and disturbing the traffic on main road. The quality of treatment had been effected due to following reasons:

- a) Overloading of the plant
- b) Damages to machinery due to inadequate operation and maintenance.
- c) Mechanical equipment is quite old and need extensive repairs and rehabilitation.

This Sewage Treatment Plant was designed for biological treatment through oxidation ponds (Facultative and Maturation) in addition to diffused aeration using helixor tubes. The increased rate of development in the area resulted in larger flows of sewage overloading the Sewage Treatment Plant while the inadequate operation and maintenance resulted in damages to the machinery and degradation of the treatment process. The worn-out components of mechanical equipment need repairs and replacement.

The present sewage flow from first five phases has been assessed as 2.4 MGD against the designed capacity of 1.2 MGD. The population-based calculations of sewage inflow for first five phases of Hayatabad has been estimated as 3.105 MGD while the ultimate sewage flow has been assessed as 8.25 MGD.

Design parameters of the original design of this Sewage Treatment Plant are not available. The detailed construction drawings or as built drawings are also not available. The area available at site for extension of the treatment plant is inadequate for even the present flow of sewage on the basis of oxidation ponds for upgrading the existing plant.

3-4 Design Parameters adopted for existing sewage Treatment plant.

On the basis of available information, we have assessed the criteria / design parameters adopted in the original design of existing Sewage Treatment Plant.

These design parameters are summarized in Table-24

TABLE-24

DESIGN PARAMETERS ADOPTED FOR EXISTING SEWAGE TREATMENT PLANT.

a)	Designed population	32,000 persons
b)	Retention period in aeration lagoon	2.4 days
c)	BOD loading on facultative pond	250 kg/ha
d)	Retention period in facultative pond	12 days
e)	Retention period in maturation pond	8.4 days
f)	Total area of site at Sewage Treatment Plant	28 acres
g)	Area already utilized	17.6 acres
h)	Area available for extension	10.4 acres

The Peshawar Development Authority will be required to provide Sewage Treatment of 8.25 MGD (for full development) in case the existing Sewage Treatment Plant is shifted from its present site or 6.55 MGD capacity in case the existing Sewage Treatment Plant is upgraded and extended to 1.7 MGD capacity.

As already the PDA has decided to shift the existing the STP to another STP already constructed on Warsak road, Peshawar.

The above design parameters are quite conservative in comparison to the normally adopted parameters. The problem had arisen due to overloading and lack of proper operation and maintenance. We are of the opinion that this existing treatment plant can be upgraded with the following:

- i) Rehabilitation of aeration equipment
- ii) Restrict of flow of sewage in to the existing Sewage Treatment Plant to its designed capacity i.e 1.2 MGD only.
- iii) Provide adequate operation and maintenance to keep the plant in good operating condition.
- iv) Provide extension to the Sewage Treatment Plant on the basis of oxidation ponds to the extent of area available and capacity according to conservative design parameters adopted in the original design.

As the area available at the site of Sewage Treatment Plant is small, calculation of capacity and dimension of the ponds proposed for extension are assessed on the basis of conservative criteria and aerated lagoons have been proposed to be changed to anaerobic pond to economize in the capital cost and also operation and maintenance costs of electrical and mechanical equipment. However, for additional safety a small curtain wall has been proposed to be constructed around aeration lagoons and anaerobic pond to restrict the fould smells, if any, spreading to adjoining areas.

According to the design calculation, the extension work at the site of existing Sewage Treatment Plant Hayatabad will be capable of treatment of 0.5 MGD of sewage from a population of 14,000 persons while the total treatment plant capacity of upgraded and extended plant will be about 1.7 MGD. The upgraded existing Sewage Treatment Plant will treat sewage from a population of 46,000 persons satisfactorily.

4- Water Supply

4-1 City Water

Description about the water supply to the Hayatabad Area is given previously in section 1-7. Number of Tube wells installed so far in Hayatabad and the average run of each tube well per day, give an approximate water supply to the Hayatabad residential and commercial areas, which is about 87,847 m³/day. Locations of the tube wells in Hayatabad is given on the map of Hayatabad in Annexure-B.

The following Table-25 shows the yield of tube wells operated by various agencies in Peshawar region.

TABLE-25

YIELD OF TUBE WELLS OPERATED BY VARIOUS AGENCIES IN PESHAWAR REGION.

No	Responsible Agency/ Organization:	Total No. of Tube wells	Average Discharge (m ³ /hr)	Average Operating Time (hrs)	Amount of water being Extracted (m ³ /day)
1.	Town-III Hayatabad Township	53	127.5	13	87847
2.	Town-I, Walled city	32	62.43	15	29965
3.	Town-II Outside Walled City	84	60.10	15	75726
4.	Cantonment Board	7	68.07	12	5718
5.	MES	16	73.27	20	23446
6.	PDA	18	104.77	13	24516
7.	Town-IV, Rural Area	27	71.10	15	28795
8.	PHD for Afghan Refugees Tube wells	6	27.22	16	2613
9.	Shallow Wells	131	6.29	-	824