Gujranwala District Report

Water Supply, Sewerage and Environment Sector

Gujranwala Regional Development Plan

2020-2030

The Urban Unit

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Acronyms & Abbreviations

AC	Asbestos Cement
ADP	Annual Development Plan
AQI	Air Quality Index
CFY	Current Financial Year
DDC	District Development Committee
DDWP	Departmental Development Working Part
DNI	Distribution Network
GDP	Gross Domestic Product
ICT	Information Communication Technology
LFS	Labor Force Survey
LG&CD	Local Government and Community Development
MC	Municipal Corporation
MS	Mild Steel
NEQS	National Environmental Quality Standards
NOx	Nitrogen Oxides
PCGIP	Punjab Cities Governance Improvement Project
PEQS	Punjab Environmental Quality Standards
PRCC	Plain Reinforced Cement Concrete
PSLM	Pakistan Social and living Standards Measurement
PVC	Poly Vinyl Chloride
RCC	Reinforced Cement Concrete
RSPM	Respirable Suspended Particulate Matter
SPM	Suspended Particulate Matter
TDS	Total Dissolved Solids
UCs	Union Councils
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Agency
WHO	World Health Organization
WSS	Water Supply and Sewerage

Executive Summary

The 'Gujranwala District Report' is one of the key reports of Regional Development Plan of Gujranwala. In Pakistan, the administrative jurisdictions are divided into divisions, districts and tehsils. These administrative units serve as the baseline for public spending from various tiers of government. As we move up the administrative hierarchy from cities and districts, division plays a crucial role in providing public services more efficiently due to economies of scales and higher decision making power. Here, the term 'region' is considered as the economic unit based on a regional vision and development plans which not only enhance competitiveness and productivity of the region but also enable efficient resource allocation and more economic returns. Considering the existing administrative structure of Punjab, the term division is used as an economic 'Region' so that adoption of the plan requires minimal changes to existing processes on which current planning and systems have evolved. Gujranwala is one of the economic hubs of Punjab and has high potential for economic growth and provides higher opportunities for private sector investments. Therefore, Gujranwala Region (division) is chosen for the first Regional Development Plan of Punjab. The region comprises of 6 districts i.e. Gujranwala, Narowal, Sialkot, Mandi Bahauddin, Hafizabad and Gujrat. This reports presents Gujranwala District Plan for Water Supply, Sewerage and Environment.

The Gujranwala District Report is developed using participatory approach combined with the field visits of Gujranwala division and primary & secondary data analysis at local, regional and national level. The planning exercise involved all relevant key stakeholders (including local community) in identification of key projects, their timelines short-medium-long term investment plan at district and regional level. Number of projects and program executed in the previous years for the improvement of municipal service delivery and environmental conditions were also assessed. Existing legal landscape, administrative and institution set-up, China Pakistan Economic Corridor (CPEC) and other initiatives as well as similar projects executed internationally were also considered in the study.

The current report comprised of eight chapters. Gujranwala district profile, current state of water supply and proposed project digest for WS is discussed in chapter I, II and III. The district is laying in the heart of a canal irrigated fertile region of Punjab, Gujranwala is part of Rachna Doab sloping from north-east to south-west and crossed by Upper Chenab Canal from north to south in the eastern part. The depth to water is typically 3 to 12 m below ground surface but in some areas it is deeper due to depletion of water resources as a result of over-pumping. Water Infrastructure shows that the water supply pipeline diameter ranges from 3" to 12" with an approximate total pipes length is 617 km. The total number of tube wells as per WASA's record is 67. The capacity of tube wells ranges from 2 cusecs to 4 cusecs with total production of 29.29 MGD and the supply is intermittent with 14-15 hours of supply per day. In addition to this, there are total 18 overhead tanks maintained by WASA, with a total capacity of 18.5 MGD. District level data shows that only 5% of total population of Gujranwala district relies on tap water as main drinking water source, whereas rest of the population is reliant on using motor pumps, hand pumps and other sources of drinking water to meet their basic needs. Hence, existing service area of WASA Gujranwala is limited to peri-center areas which makes it incapable to provide sufficient water supply to the growing needs of population. Moreover, the current water supply infrastructure is insufficient for a district of 5.0 M population (59% Urban and 41% Rural).

Considering these facts and figures, a number of projects are proposed on short-medium-long term basis for Gujranwala district in order to make the existing network efficient and enhance the water supply coverage. The short term projects include establishment of two DNI zones in the south, rehabilitation schemes for existing water supply system and provision of new urban water supply schemes in the unserved areas. Under the medium term projects, urban water supply schemes will be provided to unserved areas that fall in the extended jurisdiction of WASA G. Schemes in long projects will serve the population settlements which are beyond the ambit of WASA Gujranwala and MC Gujranwala. The total estimated cost of the proposed projects is 8,605.31 M rupees.

Likewise, only 56% (1,418,900) of the population is served by the sewerage network and provision of sewerage services to 44% of the population is presently one of the main challenge. Around 16% of the existing sewerage system in various zones across the cities is in poor condition and required immediate intervention. 13% of these pipes will require replacement in medium term time and the remaining 71% will require replacement in long term. The replacement of these pipes with poor condition is proposed to be taken as priority project and are listed in Short Term projects. Similarly extension of sewerage system coverage in the newly added UC's i.e. unserved areas in the jurisdiction of WASA and their integration with the main sewage system is also a major intervention. The disposal stations of WASAs will also require upgradation and rehabilitation and the key updates required are mentioned in the projects list. Moreover, no Waste Water Treatment Plant is operated by WASA Gujranwala and all sewage goes directly into QB Link canal through the drains. Three waste water treatment plants are currently under consideration by WASA, it is proposed that the Zone-III plant is to be constructed within the Short Term period while the Zone-I and Zone III may be constructed in medium and long term time period. The total estimated cost of the proposed projects is 13,418 M rupees.

Chapter VI and VII of the report provides current state of environment and public parks. The degradation of air quality in Gujranwala city is a major environmental concern these days. Air pollution levels in the urban centers have either crossed safe limits given in the NEQS or have reached the threshold values whereas lack of green spaces is another serious issue. On other hand, the city has got numerous significant archaeological/cultural sites like Nishan-e-Manzil, Jinnah Stadium, Gold's Gym, and Rail Bazaar etc. and a number of parks in the districts. However, these parks and social amenity areas are susceptible to environmental degradation and need improvement and management plans along with some major interventions. Considering the prevailing situation and future potential, the proposed projects comprised of interventions for air quality improvement, urban forestry plan of Gujranwala city and ecological tourism plan for Head Qadirabad, eco-revitalization of Gujranwala nullahs crossing within the city, proposal of Combined Effluent Treatment Plant (CETP) for Industrial Clusters of Gujranwala as well as Parks Improvement & Management Initiatives. The total estimated cost of the proposed projects is 264.67 M rupees.

Chapter VIII of the report addresses the key challenges and strength, weaknesses, opportunities, threats (SWOT) analysis with reference WSS service delivery and environmental management.

District Profile

1.1. Location / Boundary

Gujranwala is a Divisional, District and Tehsil Headquarter. The national highway and railway connects it to Peshawar and Karachi. Gujranwala is a historical and cultural city situated in the north east region of Punjab province. It is 63 km from Lahore and 200 km from Rawalpindi/Islamabad. It is the fifth largest city of Pakistan with a present population of about 1,662,000. It is located at 32.16o north, 74.18o east and is 226 meters (744 feet) above sea level.

It is situated on the main railway line connecting Lahore and Peshawar. The Grand Trunk Road runs parallel to the railway line and passes through the center of the city; most of the old city is on the west while the new areas are on the east.

The Chenab River forms the northern boundary of the district and bounded by Gujrat and Mandi Bahauddin districts, on the east by Sialkot district, on the south by Sheikhupura district and the west by Hafizabad district.

The district has 5 tehsils and 7 towns as exhibited below;

Table 1: Tehsils and Towns of Gujranwala District

Tehsils	Towns
1. Gujranwala City	1. Khiali Shahpure
2. Gujranwala Saddar	2. Aroop
3. Kamoke Tehsil	3. Nandipure
4. Nowshera Virkan	4. Qila Didar Singh
5. Wazirabad Tehsil	5. Wazirabad
	6. Kamonki
	7. Nowshehra Virkan

The district has 73 Union Councils in which 64 are Urban and consist of old jurisdiction of WASA-G. Presently 9 new Rural UCs (making total of 73) are added which are located on the periphery of old jurisdiction of WASA-G.

Table 2: Union Councils (UCs) of Gujranwala District

Sr. No.	UC name	Sr. No.	UC name	Sr. No.	UC name
1	Shamas Abad	26	Kot Habib Ullah	51	Rehman Pura
2	New Civil Line	27	People Colony	52	Sultan Pura
3	Mohallah Faisalabad	28	Allah Bakhash Colony	53	Muslim Town
4	Model Town	29	Kangniwala	54	Guronanak Pura
5	Ameer Park	30	Hashmi Colony	55	Lakaarwala Pull
6	Akram Colony	31	Kashmir Colony	56	Muhammad Pura
7	Gulshan Iqbal	32	Khiali Shahpur	57	Gobind Garh
8	Climax Abad	33	Gulzar Colony	58	Garjakh
9	Gil Road	34	Jinnah Colony	59	Nawab Pura
10	Kachi Fatoomand	35	Mian Sansi	60	Ismail Pura
11	Pakki Fatoomand	36	Nowshera Sansi	61	Dhulley
12	Chak Jagna	37	Qilla Sunder Singh	62	Afzal Pura
13	Ratta Bajwa	38	Chiragh Nagar	63*	Muhammad Abad

14	Khokherke	39	Chah Tailian Wala	64*	Shaheen Abad
15	Tariq abad	40	Data Gunj Bakhash	65*	Lohiyanwala & Kot Shahan
16	Satellite Town	41	Chah Malian Wala	66*	Mandiala Waraich & Ruariala Waraich
17	Popular Nursery	42	Bakhtey Wala	67*	Aroop
18	Fareed Town	43	Mubarak Shah	68*	Wanian Wala
19	Ali Park	44	Gulshan Abad	69*	Jandiala Baghwala
20	Sukh Chain Colony	45	Baghban Pura	70*	Rakh Kikkran wali
21	Wahdat Colony	46	Khalid Colony	71*	Their Sansi
22	Chaman Shah	47	Ramzan Pura	72*	Kohlowala
23	Arfat Colony	48	Shah Rukh Colony	73*	Ado Rai
24	Mujahid Pura	49	Kotli Rustam	*	UCs recently added in WASA jurisdiction
25	Abdullah Colony	50	Qazafi Road		

1.2. Demographic and Socio Economic Trends

Gujranwala is one of the major recipients of **migrants**. According to LFS, 2014-15, major cities of the Punjab i.e., Lahore, Rawalpindi, Faisalabad, Gujranwala and Multan received 55% of the total migrants from both rural and urban areas and Gujranwala stood as the top third choice of these migrants.[1]

Figure 1: Percentage of Urban and Rural Population in Gujranwala District[2]

Almost 41% of people reside in rural areas of the Gujranwala district. The recent population census indicates an average of 2.40 growth rate in the urban areas of the district since 1998.

Table 3: Urban and Rural Population Growth Rate of Gujranwala District from 1998 to 2017[3]

Area	Household	Population 1998	Population 2017	Average Annual Growth rate 1998 - 2017
Rural	301,072	1,523,106	2,065,260	1.61
Urban	446,142	1,877,834	2,948,936	2.40

Table 4: Existing Administrative Units and Population (2020)

Administrative Units in Gujranwala District	Population
Tehsil Council, Wazirabad	528,415
Tehsil Council, Nowshera Virkan	424,679
Tehsil Council, Sadar Gujranwala	367,631
Tehsil Council, Kamoke	268,192
Metropolitan Corporation, Gujranwala	2,477,375

[1] PBS (2015). Labor Force Survey of Pakistan 2014-15. Islamabad: Pakistan Bureau of Statistics.
[2] Ibid
[3] Ibid

Municipal Corporation, Kamoke	264,217
Municipal Committee, Wazirabad	138,433
Municipal Committee, Qila Dedar Singh	84,302
Municipal Committee, Ghakkar	76,501
Municipal Committee, Nowshera Virkan	49,499
Town Committee, Alipur Chatta	60,989
Town Committee, Tatlay Aali	38,285
Town Committee, Sadhoke	26,002
Town Committee, Sohdra	26,058
Town Committee, Wahndo	23,033
Town Committee, Nokhar	23,283

Gujranwala is known as a vibrant economic city of the Punjab with palpable contribution in agriculture and the industrial sector. It is one of the major wheat and rice producers in the Punjab.

Industrial development in Punjab has been concentrated in seven of the most industrialized districts i.e. Faisalabad, Lahore, Gujranwala, Sialkot, Multan, Sheikhupura and Gujarat of the province which accounts for 75% of Punjab's Industry.[4] Gujranwala alone contains 13.92% of total industrial units in Punjab. Most of these industries include Electrical appliances, Fabricated Metal Products, Wearing Apparel, Food Products and Textiles. Production of good quality ceramics is also one of the most important sectors in Gujranwala.

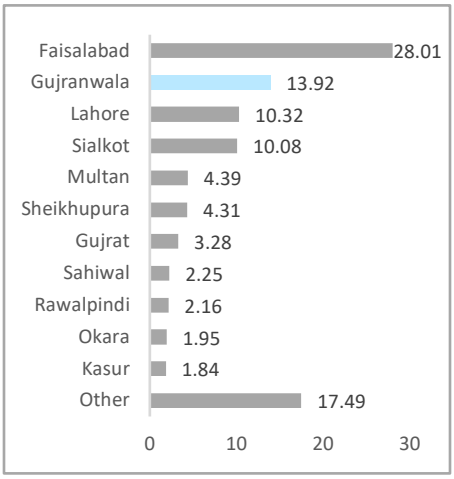


Figure 2: District-wise Percentage of total industrial units in Punjab

The congested traffic flow and the inadequate discarding services have coupled to create a deadly package that has triggered the process of contamination of the surroundings of the district. It may be noted that no treatment plant has yet been installed in the district and even the hospitals lack incineration Plants.

1.3. Climate

The climate of the city is hot and dry during summer and moderately cold in winter. The summer season starts in April and continues till September. June is the hottest month with means maximum and minimum temperatures of 40 and 27 °C, respectively. The winter season begins in November and lasts till March. January is the coldest month. The mean maximum and minimum temperatures during this month are 19°C and 5 °C respectively. The sky is frequently overcast during winter with meager rainfall. The monsoons set in July and continue till September. The eastern part of the district receives more rain. The average annual rainfall in the district during 1961-98 has been recorded to be 628.7 millimeters[1]. On most of the days the wind speed has been documented to be within the range of 5 km/hr to 12 km/hr, whereas wind directions are mostly towards West North West towards North and ends up at East South East.

1.4. Soil and Geological Conditions

Lying in the heart of a canal irrigated fertile region of Punjab, Gujranwala is part of Rachna Doab sloping from north-east to south-west and crossed by Upper Chenab Canal from north to south in the eastern part. The area is plain with the ground surface sloping gently from NE to SW. The average reduced level above

[4] Census of Manufacturing Industries 2015-16

sea is approximately 743 feet. There is a level difference of around 5.5 meters from North-East corner to the South-West corner of the City[5].

The top surface comprises vegetative cover which is underlain by Lean Clay/Silt (Soft to firm), up to 1m depth, the material is underlain by Silty Sand (medium dense to dense) up to a maximum investigated depth of 30 m. The soil is alluvial and fertile. It is a flat strip of land running roughly East to West[6].

Topographically, Gujranwala is fairly plain land with the ground surface sloping gently from NE to SW. It is also a plain of alluvial material and scattered rocks at deeper depth. The area is underlain by Pleistocene deposits to a depth of several thousand meters. The first 200 meters of these deposits consist of approximately 70% silty sand interspersed with limited clay layers. The strata are generally heterogeneous with little vertical or lateral continuity.

1.5. Environmental Landscape

Gujranwala's air has hazardous nitrogen oxides and particulates much higher than the limits recommended by the World Health Organization and Punjab Environmental Quality Standards. The presence of sulphur oxide, carbon monoxide and particulate matter is continuously increasing due to multiple anthropogenic factors such as vehicular pollution, excessive road dust, construction materials, fossil fuel and industrial emissions, tanneries, chrome plating units and metal smelters. Unplanned industrialization is one of the major reasons of air and ground water pollution in the district as well as in the whole region[7].

According to the Dawn Survey (2008)[8], the forest department has planted on average 77 trees along roads, 30 trees per kilometer along canals and 31 trees per kilometer along railway tracks. However, this number is much lesser than the recommended number of at least 500 trees per kilometer. Road dust is another

Current State of Water Supply

2.1. Water Resources

Ravi and Chenab are the main rivers of the area, which flow from Northeast to Southwest. The land between these two rivers is called Rechna Doab and Gujranwala lies just in the middle or center of the doab. Upper Chenab channel or Chenab – Ravi link channel is also passing to the east of city and is a major source for recharging the aquifer. Fine to coarse sand is present as an unconfined aquifer, highly transmissive and suitable for high capacity tube wells. The depth to water is typically 3 to 12 m below ground surface but in some areas it is deeper due to depletion of water resources as a result of over-pumping. Ground water quality is fresh (defined as acceptable in terms of its salinity). The availability of deep raw water (350 to 500 ft below ground level) is said to be abundant. The pumping head is about 200 ft. The estimated amount of surface runoff is about 2000 Cusecs (ft^3/s) per year. For groundwater recharge, confined aquifers are available at various locations in Gujranwala city. The confined aquifers are available at different locations in Gujranwala at an average depth of about 276 ft with an average saturated thickness of 243 ft.

Ground water resources in Gujranwala are adequate and due to recharging of the transmissive aquifer are sustainable. However, the shallow water table in the city is being depleted due to the massive use of individual pumps. Also the shallow water is seriously contaminated (inter alia with sewage water) and therefore the resource as a drinking water resource without water purification is actually already in jeopardy.

Currently, this significant amount of storm runoff is not fully utilized in order to meet the water requirements of the inhabitants of the city. The quality of storm water is a very serious issue for proper runoff management in the project area.[9] As water moves across the land surface during or after a storm, it transports dissolved and suspended materials present along the path of flow. In many cases, the pollutants carried to streams and lakes by surface runoff act as significant contributors of water pollution. Wash-off materials ranges from sediment, mineral salts, heavy metals, nutrients, pesticides, biodegradable organics and microbial pollutants[10].

2.2. Water Coverage

Coverage area of WASA Gujranwala (WASA-G) is almost 59.2 km^2 (37% of the total area) which accommodates around 750,000 population of the city. The city has been divided into 3 zones (Zone I, Zone II and Zone III).

[9] Journal of River Engineering Vol. 1.Utilization of Storm Runoff for Ground water Recharge in Urban Areas-A Case Study of Gujranwala City in Pakistan

[10] Linsley, R.K., Kohler, M.A. and Paulhaus, J.H. Hydrology for Engineers, 3rd Edition, 5th Reprinting, McGraw-Hill Co. Singapore, ISBN: 0-07-Y66389-0, 1985

The water is supplied by 67 tube wells of 2-4 cusec located in all three zones. The supply is intermittent with 14-15 hours of supply per day. The total production is given as 29.29 MGD (133,155 m^3/day).[1] According to WASA-G, the system is capable of providing nearly 24-hour service but allegedly the hours of service are curtailed to save electricity costs. The unaccounted-for-water is high, up to 32% and often results due to leakages in the old pipes.

Table 5: Water Coverage Area and Number of Connections in Gujranwala City (WASA-G)

#	Description	Unit
(i)	Water supply coverage area	37% / 59.2km^2
(ii)	Population	750,000 No's
(iii)	No of zones	3
(iv)	Non-Revenue Water	32 %
(v)	Domestic Connections	61725 No's
(vi)	Metered Connections	Nil
(vii)	Commercial Connections	1970 No's
(viii)	Industrial Connections	71 No's
(ix)	Hypo chlorinator	67 No's

The water supply service is intermittent. Water is pumped directly into supply with the help of a single lift system which uses shaft-driven direct-coupled electric motors. Although the efficiency of this arrangement is not measured, however, it is said to be better than 70% electricity is purchased from WAPDA but they do not offer a preferential tariff to WASA and they do not have a cheaper off-peak tariff.

Cost recovery for urban water services is extremely low. With insufficient finances, utilities are unable to keep supply systems running continuously and lack the resources to expand services to keep pace with growing urban populations. Low cost recovery is a reflection of low tariff levels and high levels of leakage and theft (nonrevenue water). Rural water services are far worse than urban services, reflecting the technical challenge of delivering water services over long distances and the financial challenge of higher costs with fewer customers to serve.

2.3. Water Distribution Network

Different pipe materials have been utilized in the network which includes Mild Steel (MS), Plain Reinforced Cement Concrete (PRCC), Asbestos Cement (AC) and Poly Vinyl Chloride (PVC). The pipelines mostly PVC 4 inches to 6 inches diameter have been made by the WASA during the recent past. Overall, pipeline diameter ranges from 3" to 12" and approximate pipes length is 617 km.

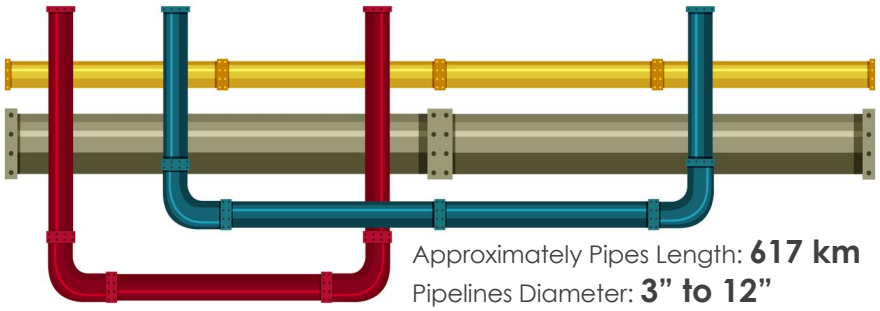


Figure 3: Diameter and Length of Water Distribution Network

The old pipes especially PRCC pipes which have socket spigot joints have already out lived their life capacity and consequently have deteriorating quality as well. Despite this, incident of leakages in PRCC pipelines are

not frequent rather rare as verified from the maintenance staff. Old AC pipe is still responding and failure ratio is at the minimum level.

However, PVC pipes failure is frequent. The reasons for the frequent leakages in PVC pipes are probably due to its construction that was not according to the specifications and standard procedure. Some PVC pipes have not being laid with required earth cover which is also a cause of frequent leakages. The design life of the old pipelines in terms of capacity has long expired in 1985.

The additional lines mostly of 6 inches PVC pipe have been laid over the old system because the old system is 8 to 10 feet below the existing road level/ground level. The additional lines are compensating the reduced capacity of old network. According to the data received from WASA – G, the design criteria for water supply is 50 GPD. However, the designed criteria of WASAs for domestic water supply is 35 GPD. This standard for the determination of domestic water consumption is based on the population slab.

2.4. Water Consumption

The level of water consumption for Gujranwala city is 225 liter per capita per day as per the data received from WASA-G. Conversion of total demand to per capita demand (liters per capita per day) allows for the separation of population growth from the growth in unit consumption. The design criterion for WASA has proposed 160 lpcd water consumption for residential purposes.

Table 6: Water Consumption in Gujranwala City

#	Description	Unit
(i)	Per Capita water Consumption	225 lpcd
(ii)	Total Water Consumption	37.5 MGD

2.5. Water Demand

Despite the significant population increase, there has been no definite plan for increasing the capacity of water sources to meet the increasing water demand. Current and future water demand of Gujranwala city is as exhibited in Table 8.

Table 7: Water Demand – Projection till 2047

Parameters	Water Demand (Gallons per Day)				
	2017	2020	2030	2040	2050
Population	2,948,936	3,166,396	4,013,884	5,088,202	6,450,062
Domestic (GD)	103,212,760	104,491,065	132,458,162	167,910,668	212,852,059
Commercial (GD)	15,481,914	15,673,660	19,868,724	25,186,600	31,927,809
Institutional (GD)	10,321,276	10,449,107	13,245,816	16,791,067	21,285,206
Industrial (GD)	10,321,276	10,449,107	13,245,816	16,791,067	21,285,206
Losses (GD)	41,801,168	42,318,881	53,645,555	68,003,821	86,205,084
Total	181,138,394	183,381,820	232,464,074	294,683,223	373,555,364

2.6. Water Quality

The ground water in most of the area of Gujranwala is sweet and occurs in abundance. However, the secondary data analysis of ground water quality shows deprived results, specifically, in case of Nitrates.

As per Punjab Environmental Quality Standards (PEQS) for drinking water, the threshold limit for nitrate is ≤50 mg/l. Figure 3 shows high level of nitrates in the ground water of most of the areas of Wazirabad and Moshhra Vikran. Also, it was recorded on inspection that some areas of Gujranwala Sadar, city and Kamoki also contain higher concentration of nitrates. It is evident from the literature review that groundwater

drawn from relatively shallow aquifer and shallow groundwater is more susceptible to nitrate contamination particularly in areas with more porous and well drained soils. Shallow wells less than 120 feet deep are more susceptible to nitrate contamination, where soils are very porous and where the underlying material is very gravelly. Since, it is very soluble and completely mobile in dissolved form so it can readily move with water through the soil and heavy rainfall or over irrigation which tends to move the nitrates into groundwater systems that may be later used for drinking purposes. On other hand, other reasons for contamination of the well waters such as the improper well construction, well location, overuse of chemical fertilizers, or improper waste disposal cannot be ignored either.[11]

Similarly, fluoride concentration is much higher than the permissible limit i.e. ≤1.5 ppm in majority of the areas of Kamoki and some areas of Gujranwala Saddar and Gujranwala city. High concentration of fluoride could be due to geological as well as anthropogenic sources such as improper or overutilization of fertilizers and inappropriate irrigation practices. However, Total Dissolved Solids (TDS) and arsenics are found in the permissible limit of PEQS.

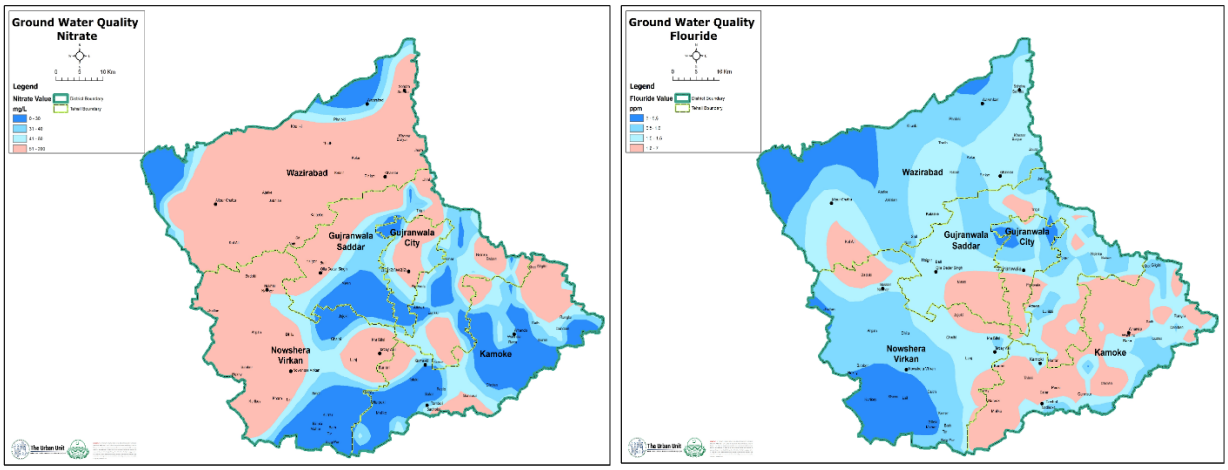


Figure 4: Fluoride and Nitrate Concentration in Ground Water of Gujranwala District

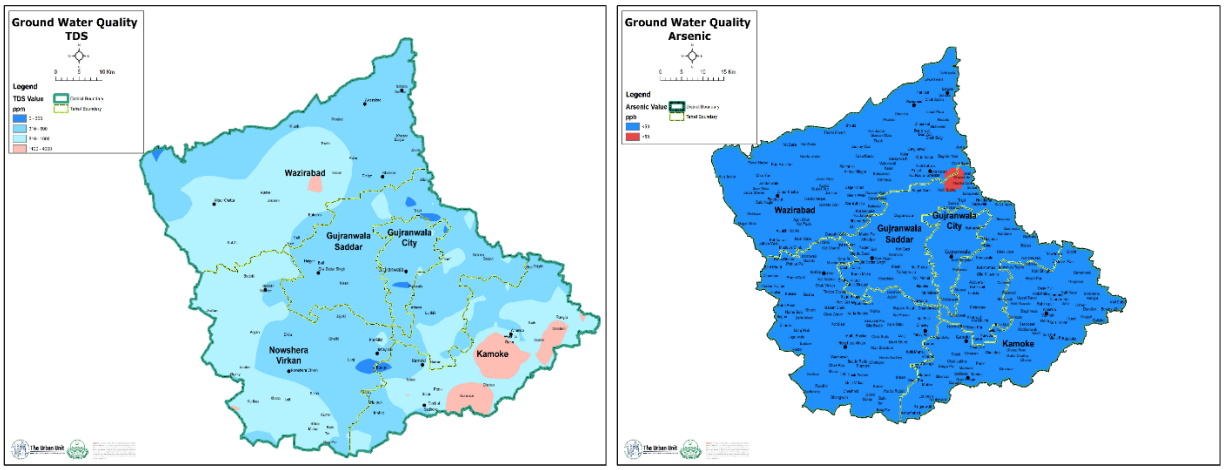


Figure 5: TDS and Arsenic Concentration in Ground Water of Gujranwala District

[11] M. K. Daud, etal. 2017. Drinking Water Quality Status and Contamination in Pakistan. *BioMed Research International*. Pg 18 pages. https://doi.org/10.1155/2017/7908183

2.7. Existing water supply Infrastructure

2.7.1. Main Sources of Water supply in Gujranwala District

Main sources of drinking water supply in Gujranwala district is motorized pumping in both Urban and Rural areas as per the figures available in PSLM 2014-15 (Fig. 2). The stats show grave picture in rural areas where the rural population has no access to tap water supply and a majority of persons are highly dependent upon hand pumps and motor pumps. District level data[12] shows that only 5% of total population of Gujranwala district relies on tap water as main drinking water source, whereas rest of the population is reliant on using motor pumps, hand pumps and other sources of drinking water to meet their basic needs. Thus, an evidence based planning is required for equal distribution of resources to the districts for improved service delivery of the whole region.

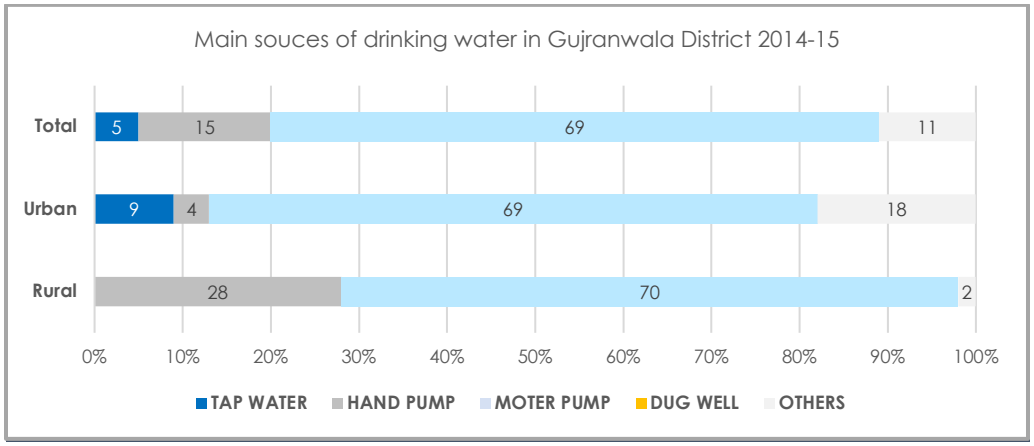


Figure 6: Main Sources of Drinking water in Gujranwala district

2.7.2. Tube Wells

Water source of the Gujranwala water supply system is based on the tube-wells. The total number of tube wells as per WASA's record is 67. The capacity of tube wells ranges from 2 cusecs to 4 cusecs. Keeping in view the population growth, more tube well will be required in the next 10 to 15 years for which WASA-G has already given an estimate of 110 new tube wells each of 2 cusec capacity. Most of the tube wells are operated at an average of 12 hours per day except the operation period which is 16 hours in Model Town and Sheranwala Bagh.

The breakup of the existing number of the tube wells in different zones is shown in table 9 and figure 3;

Table 8: Existing Tube wells[13]

#	Description	Unit
(i)	Ground Water (tube wells based system)	■ Yes ☐ No
(ii)	No of Tube Wells	Total No. 67 ■ Functional (67) ☐ Non-Functional (0)
	Zone I	24
	Zone II	22
	Zone III	21
(iii)	Capacity of Functional Tube Wells	154 cusec

[12] PSLM, 2014-15
[13] WSS and Environmental Baseline Data Collection Performa, 2020

		2 - 4 cusec / tube well
(iv)	No of Bulk water meters	67 No's

2.7.3. Overhead reservoirs

There are total 18 overhead tanks maintained by WASA. In addition to it, there are many small overhead tanks with capacity of 5,000 to 10,000 gallons located in private housing scheme and factories.

In the period of power load shedding, mostly overhead tanks are not being operated and direct supply is being maintained intermittently.

Table 9: Water Demand – Projection till 2047[14]

#	Description	Unit
(i)	No of Overhead Reservoirs	Total No. 18 ■ Functional ☐ Non-Functional
(ii)	Capacity of Overhead Reservoirs	18.5 M Gallons
(iii)	Ground Water Storage Tank	Nil

It has been generally observed that the 300,000 gallons tank if filled will be emptied in 20 to 30 minutes on operation of the sluice valve on the delivery main. The main reason is due to intermittent supply in different hours which creates negative head in the network. The tank in Sheranwala Bagh was designed to act as a balancing tank. No tank is being operated as act concept of balancing tanks. In the balancing tanks, one rising mains from the tube wells is installed which also acts as a delivery main. The pipeline arrangement for the tanks for separate pipes are termed as rising mains, delivery mains, scour main and overflow main.

The total capacity of overhead tanks maintained by WASA is 18.5 MGD. There is no underground water tank or filtration plant available in the city.

Figure 7: Different types of OHR in Gujranwala

[14] WSS and Environmental Baseline Data Collection Performa, 2020

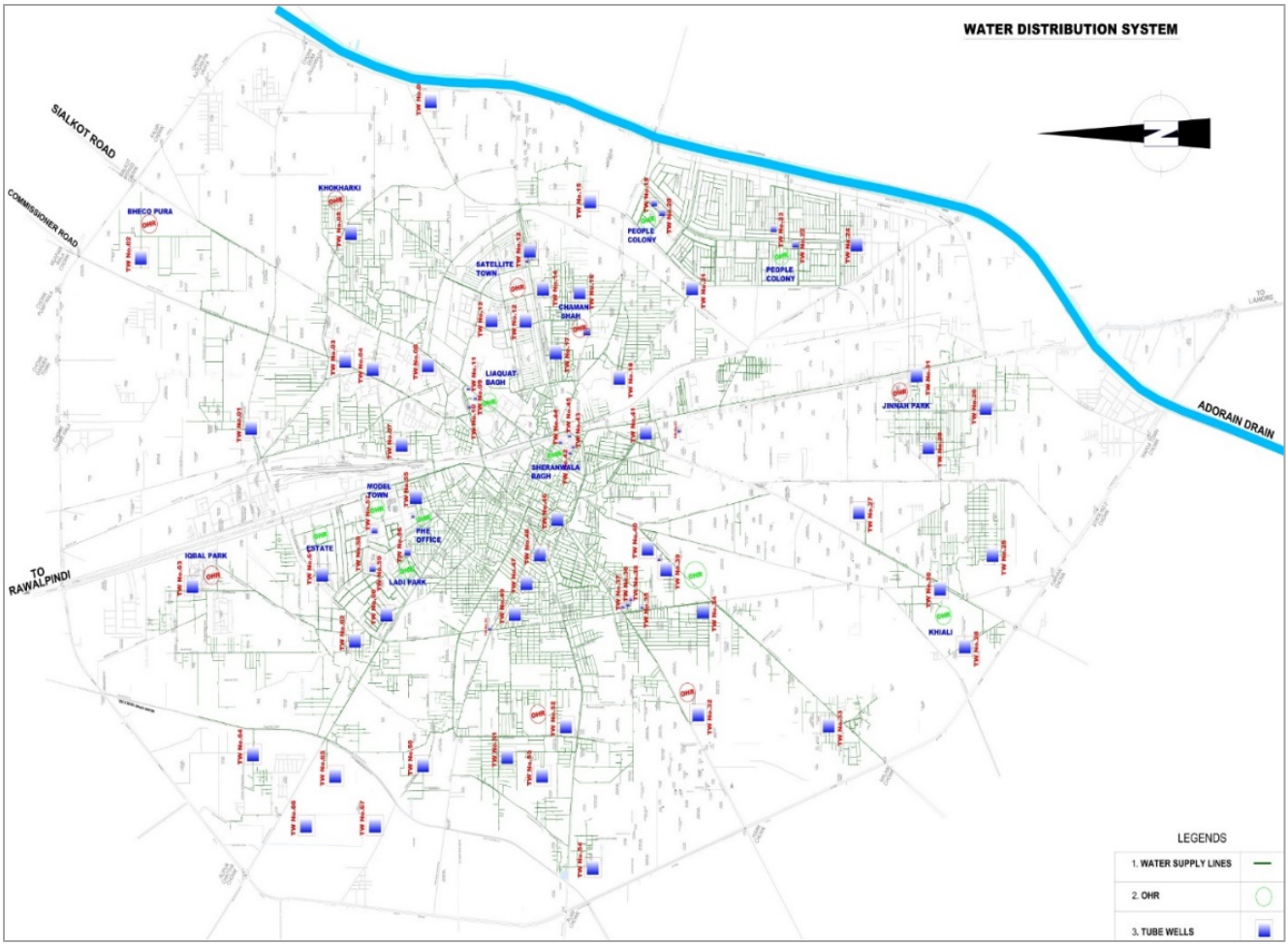
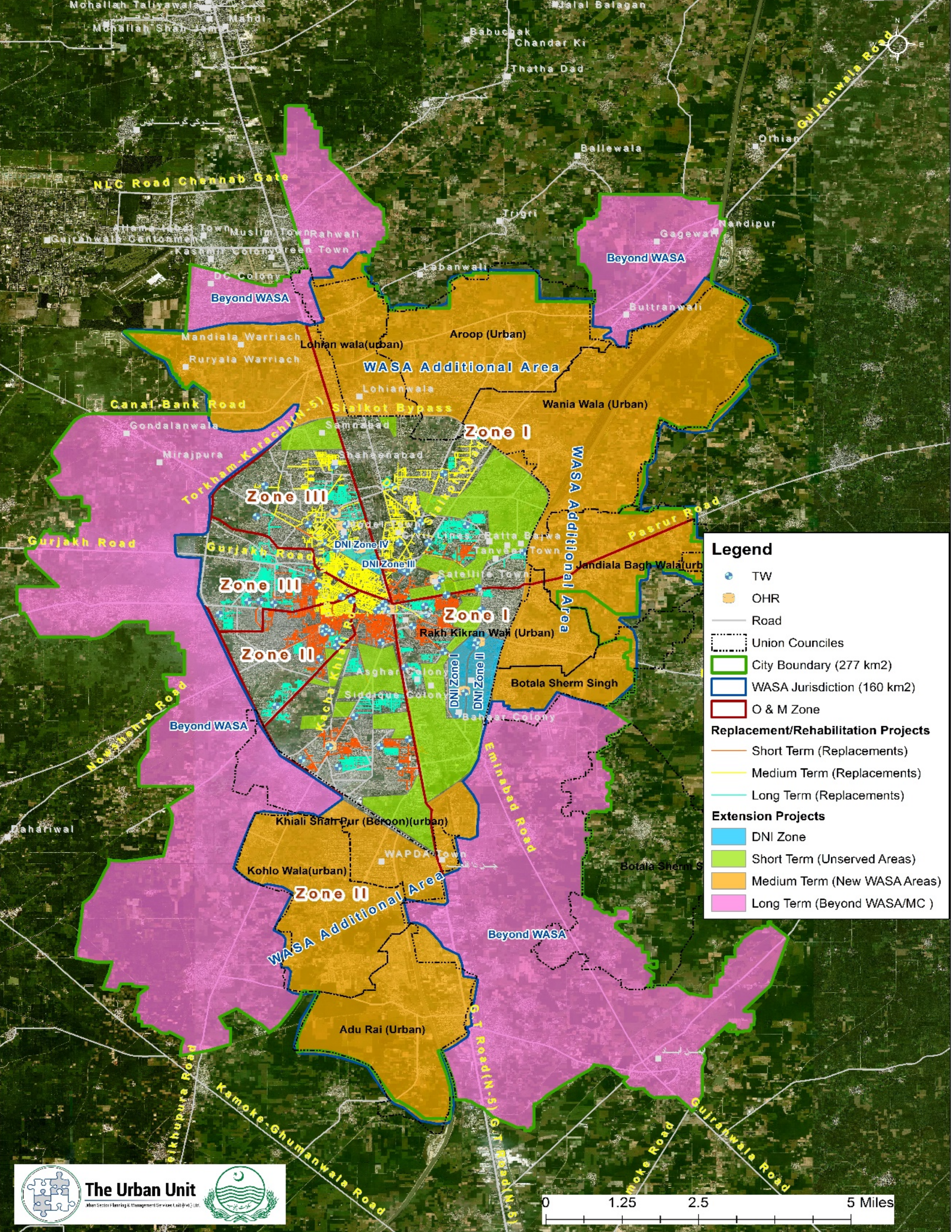


Figure 8: Tube wells and OHR in Gujranwala City[15]

[15]WSS and Environmental Baseline Data Collection Performa, 2020


Legend
TW
OHR
Road
Union Counciles
City Boundary (277 km2)
WASA Jurisdiction (160 km2)
O & M Zone
Replacement/Rehabilitation Projects
Short Term (Replacements)
Medium Term (Replacements)
Long Term (Replacements)
Extension Projects
DNI Zone
Short Term (Unserved Areas)
Medium Term (New WASA Areas)
Long Term (Beyond WASA/MC)
Zone I
Zone II
Zone III
DNI Zone IV
DNI Zone III
DNI Zone I
DNI Zone II
WASA Additional Area
Beyond WASA
Aroop (Urban)
Lohian wala(urban)
Wania Wala (Urban)
Jandiala Bagh Wala(urb
Rakh Kikran Wali (Urban)
Botala Sherm Singh
Khiali Shah Pur (Beroon)(urban)
Kohlo Wala(urban)
Adu Rai (Urban)
Gujranwala Road
NLC Road Chennab Gate
Canal Bank Road
Sialkot Bypass
Torkham-Karachi(N-5)
Gurjakh Road
Pasrur Road
Nowshehra Road
Eminabad Road
G.T Road(N-5)
Kamoke-Ghumanwala Road
The Urban Unit
0 1.25 2.5 5 Miles

Project Digest - WS

3.1. Analysis of on-going / up-coming schemes

According to the development portfolio of WSS Gujranwala CFY 2020-21, there are total 101 on-going schemes for which 350.7 million rupees are allocated. No new scheme has been added in the current ADP. Out of 101 schemes, 99 schemes are sewerage schemes as exhibited in the Table 10.

Table 10: Current Development Portfolio of WSS of Gujranwala District

ADP Scheme Sub Type	Total Schemes	Water Supply Schemes	Sewerage Schemes	Cost (M PKR)	Allocation (M PKR)
Local Development Program	4	1	3	650	5.9
PMs SDGs Program	3	0	3	30	3
Rural Sewerage Schemes	88	0	88	7175.609	316.977
Rural Water Supply Scheme	1	1	0	135	2
Urban Sewerage Drainage	5	0	5	999.011	22.9
Total	101	2	99	8989.62	350.777

Out of 88 rural sewerage schemes, two schemes are on-going since 2014; two were approved in 2015; twelve schemes were approved in 2016; sixty four schemes in 2017 (43 DDC, 20 DDWP) and eight schemes were approved in 2019. Considering the fact that the existing Water Supply system coverage by WASA-G in the city which is 37% as compared to Sewerage/Drainage System which is almost 70%. These and the other projects have been mainly focused on rehabilitation and construction of new sewerage lines.

3.2. Proposed Projects

Based on the consultation meetings, planning exercise, WSS statistics, gaps in service delivery and future opportunities, on-going ADP schemes and the goals & objectives of regional plan, a phase wise plan is developed for the Gujranwala district in two categories i.e. Rehabilitation of existing assets of water supply and Extension of WSS services in underserved areas. These phases are;

Table 11: Proposed Project Phases

	Short Term (up to 3 years)	Replacement / Rehabilitation
	Medium Term (3 to 5 years)	
	Long Term (5 to 10 years)	
	Short Term (up to 3 years)	Unserved Areas
	Medium Term (3 to 5 years)	New WASA Areas
	Long Term (5 to 10 years)	Beyond WASA / MC

Gujranwala city is divided in to three zones for the provision of WSS services. The proposed projects are aimed to enhance the water supply coverage to unserved population and to improve the existing water supply service in zone 1 (north and south) of Gujranwala district.

The short term projects include establishment of two DNI zones in the south, rehabilitation schemes for existing water supply system and provision of new urban water supply schemes in the unserved areas.

Under the medium term projects, urban water supply schemes will be provided to unserved areas that fall in the extended jurisdiction of WASA G. Schemes in long projects will serve the population settlements which are beyond the ambit of WASA Gujranwala and MC Gujranwala.

Rehabilitation of existing water supply setup includes replacement of old damaged delivery system, revival of inefficient machinery and civil structures, installation of new chlorinator, pressure gauges and bulk water meters. Provision of new schemes will cater construction of tube wells, Overhead reservoirs, and distribution systems. Implementation of the projects in true letter and spirits will enhance water supply coverage to the unserved areas and will facilitate to plug the loopholes in existing system.

Existing service area of WASA Gujranwala is limited to peri-center areas which makes it incapable to provide sufficient water supply to the growing needs of population. In order to make the existing network efficient and enhance the water supply coverage, construction of 48 new tube wells having capacity of 4 cusecs is proposed under this scheme. It will enhance the overall productivity of water supply network. This project will include well drilling, installation and commissioning of equipment, development and testing and civil works. The total estimated cost of the proposed projects is 8605.31 M rupees.

In this context, following projects are proposed in all three zones;

3.2.1. Short Term

Zone	Proposed Schemes	Scope	Cost PKR (M)	Mode
-	(i) Installation of 27 SCADA Monitoring System in Gujranwala City.	Installation of monitoring system, network	20.0	Public
-	(ii) GIS based inventory of water supply schemes (urban) of Gujranwala district.	Field Survey, GIS Mapping	30.0	Consultancy
1S	(iii) Establishment of two DNI zones in Peoples Colony and Bahar Colony, Kashmir Road, Gujranwala.	Laying replacement of water distribution network, installation of bulk meters, water meters and SCADA Monitoring System	141.80	Donor / Public / PPP
-	(iv) IT based system for billing & collection		20.0	
1S	(v) Rehabilitation or Replacement of Water Supply Scheme of Wahdat Colony, Shahzada Shaheed Colony, Irfat Colony and Islam Pura of Zone-I (South), Gujranwala.	Replacement of HDPE Pipes 4", 6", 8", 10".	48.49	Donor / Public
1 S	(vi) New urban water supply schemes for underserved areas of Zone – I South (Qazi Town, Green Town, Sadaat Town, Shadman Colony, Nabi Pura, Rana Colony, Siddqi Colony, Allah Baksh Colony, Asghar Colony,	Water supply network, scada, bulk meter, water meters, tubewell, OHR	1,356.4	Donor / Public

Zone	Proposed Schemes	Scope	Cost PKR (M)	Mode
	Wahdat Colony, Sadar Town, Qasim Town, Tanveer Town, Fazal Town and Allah Rakha Town), Gujranwala.			
1 N	(vii) New urban water supply schemes for underserved areas of Zone – I North (Qasim Town, Satellite Town, Sadar Town, Tanveer Town, Fazal Town, Madina colony and Allah Rakha Town), Gujranwala.	Water supply network, scada, bulk meter, water meters, tubewell, OHR	1,356.4	Donor / Public
1	(viii) Construction of 5 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	5 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	70.0	Donor / Public
2 N	(ix) Rehabilitation of Water Supply Scheme of Mominabad (A, B), Chah Tallian Wala, Muhammad Nagar, Chah Habib, Rasul Pura, Shahrukh Colony and Faisal Colony in Zone – II (North), Gujranwala.	Replacement of HDPE Pipes 4", 6", 8"	74.56	Donor / Public
2 S	(x) Rehabilitation of Water Supply Scheme of Mehar Bagao and Qaiser Colony in Zone – II (South), Gujranwala.	Replacement of HDPE Pipes 3", 4", 6", 8", 12"	117.20	Donor / Public
2N	(xi) New urban water supply schemes for underserved areas of Zone – II (North) (Hajvery Town, Chiragh Nagar and Gulberg Colony), Gujranwala.	Water supply network, scada, bulk meter, water meters, tubewell, OHR		Donor / Public
2 S	(xii) New urban water supply schemes for underserved areas of Zone – II (South) (Gulshan Colony, Niazi Park, Riaz Colony, Rehman Colony, Nowshera Sansi and areas adjacent to MianSasi and Sheikhupura road), Gujranwala.	Water supply network, scada, bulk meter, water meters, tubewell, OHR	508.65	Donor / Public
2	(xiii) Construction of 5 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	5 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	70.0	Donor / Public
3 N	(xiv) New Water Supply Scheme	Water supply network, scada, bulk meter,	169.55	Donor / Public

Zone	Proposed Schemes	Scope	Cost PKR (M)	Mode
		water meters, tubewell, OHR		
3 S	(xv) Rehabilitation of Water Supply Scheme of Rasul Pura in Zone – III (South)	Replacement of HDPE Pipes 4", 6", 8", 10", 12"	28.73	Donor / Public
3	(xvi) Construction of 3 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	3 x 3.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	42.0	Donor / Public
	Total		4203.78	

3.2.2. Medium Term

Zone	Proposed Schemes	Scope	Cost PKR (M)	Mode
1 S	(i) Rehabilitation of Water Supply Scheme of area around Gujranwala.	Replacement of HDPE Pipes 4", 6", 8", 10", 12", 18"	48	Donor / Public
1 N	(ii) Rehabilitation of Water Supply Scheme of North Zone I, Gujranwala.	Replacement of HDPE Pipes 3", 4", 6", 8", 10", 12", 18", 24"	126.97	Donor / Public
1,2,3	(iii) New urban water supply scheme for underserved areas falls in expanded jurisdiction of WASA – G (Rakh Kikran Wali (urban), Botalla Sharm Singh, Jandianwala Baghwala (urban) and Wania Wala (urban), Gujranwala. (iv) New urban water supply schemes in Wapda Town and Chand Da Qila Zone II (South), Gujranwala. (v) New Urban water supply schemes Ruryala Warraich and Mandiala Waraich in Zone – III North	Water supply network, scada, bulk meter, water meters, tubewell, OHR	3376.85	Donor / Public
1	(vi) Construction of 5 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	5 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	70.0	Donor / Public

Zone	Proposed Schemes	Scope	Cost PKR (M)	Mode
2	(vii) Construction of 5 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	5 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	70.0	Donor / Public
2 S	(viii) Rehabilitation of Water Supply Scheme of Krishan Nagar, Model Town and Dhullay in Zone – II (South).	Replacement of HDPE Pipes 4", 6", 8", 10"	28.92	Donor / Public
3 S	(ix) Rehabilitation of Water Supply Scheme of Guru Nanak Pur in Zone – III (South).	Replacement of HDPE Pipes 4", 6", 8", 12", 16"	36.0	Donor / Public
3	(x) Construction of 3 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	3 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	42.0	Donor / Public
	Total		3798.74	

3.2.3. Long Term

Zone	Proposed Schemes	Scope	Cost PKR (M)	Mode
1	(i) Urban water supply scheme along settlements (urban) around Eminabad Road, Gujranwala.			Donor / Public
1	(ii) Construction of 12 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	12 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	168.50	Donor / Public
2 S	(iii) Expansion of water supply schemes in Shahpur (urban) Zone II (South), Gujranwala.		50.0	Donor / Public
3 S	(iv) Construction of 7 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	7 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	98.29	Donor / Public
3 N	(v) Expansion of Water Supply network along Gondlawala Road Zone – III (North)		50.0	Donor / Public

3	(vi) Construction of 4 new tube wells (4.0 Cusec Capacity) in Gujranwala (Urban)	4 x 4.0 cusec tube wells, boring, machinery, civil works, bulk meter, chlorinator	56.0	Donor / Public
3 N	(vii) Expansion of Water Supply network along Gondlawala Road Zone – III (North)		50.0	Donor / Public
	Total		602.79	

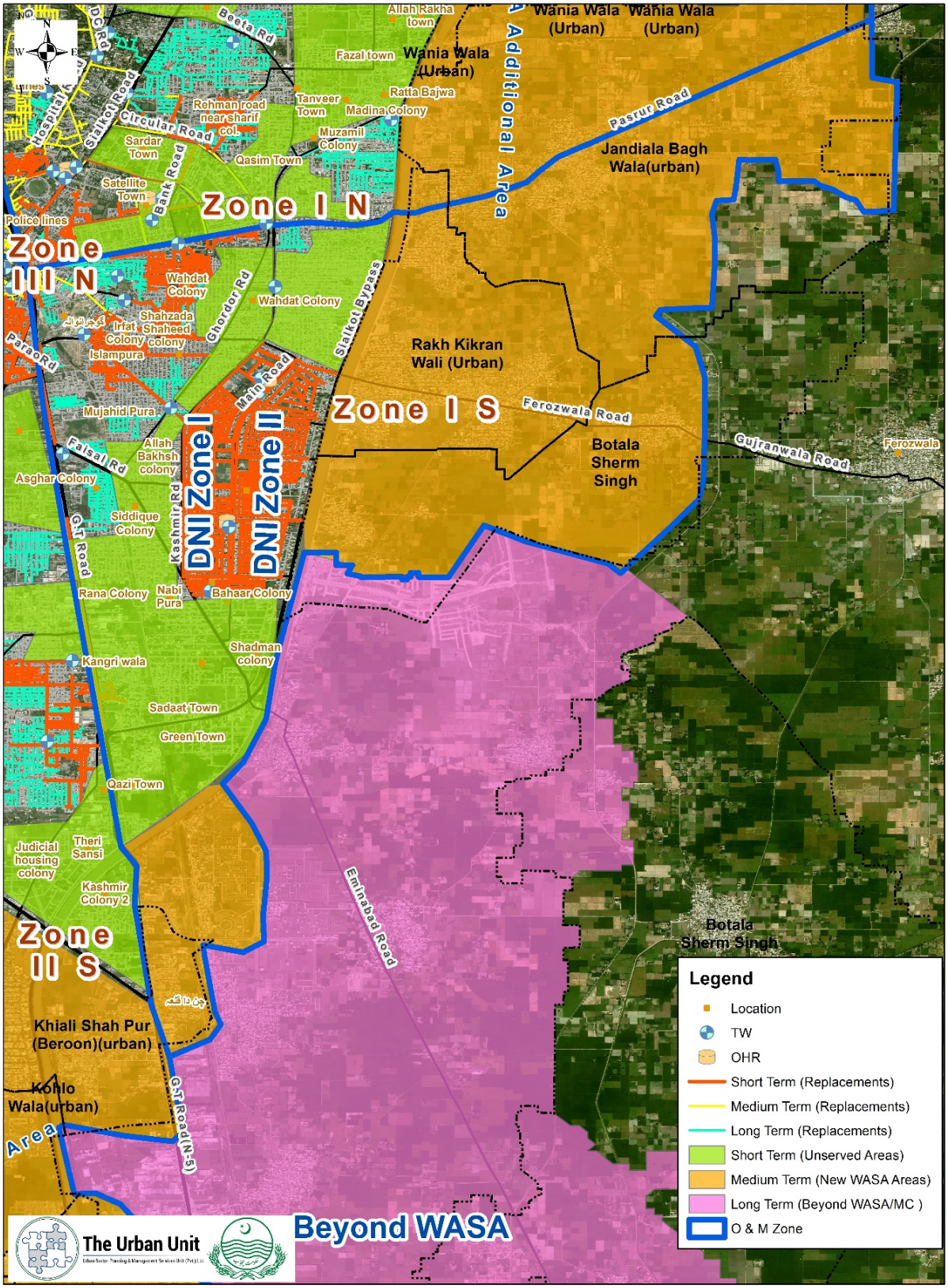


Figure 9: Rehabilitation and Expansion Pan of Zone – I South and North

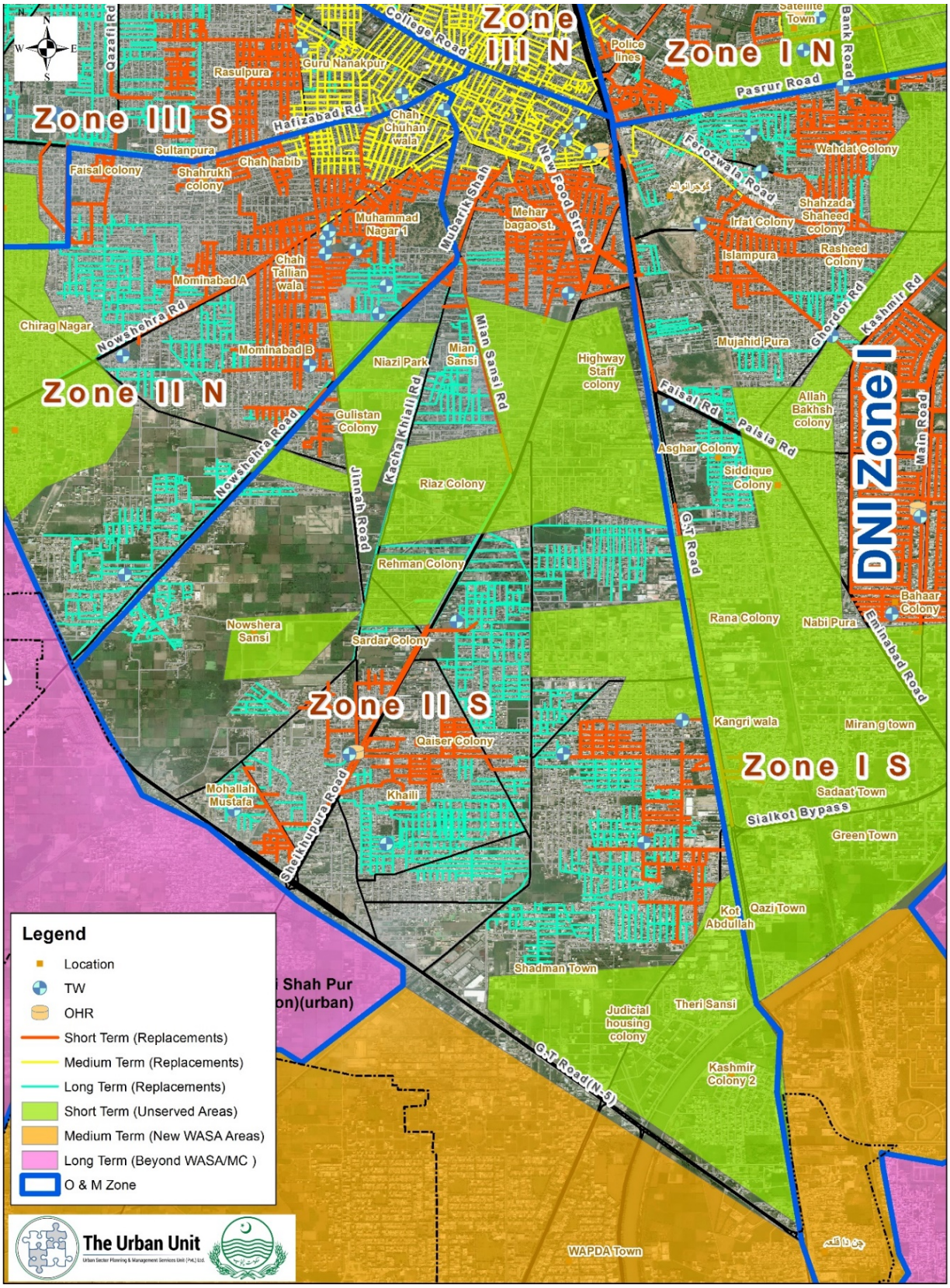


Figure 10: Rehabilitation and Expansion Pan of Zone – II (North)

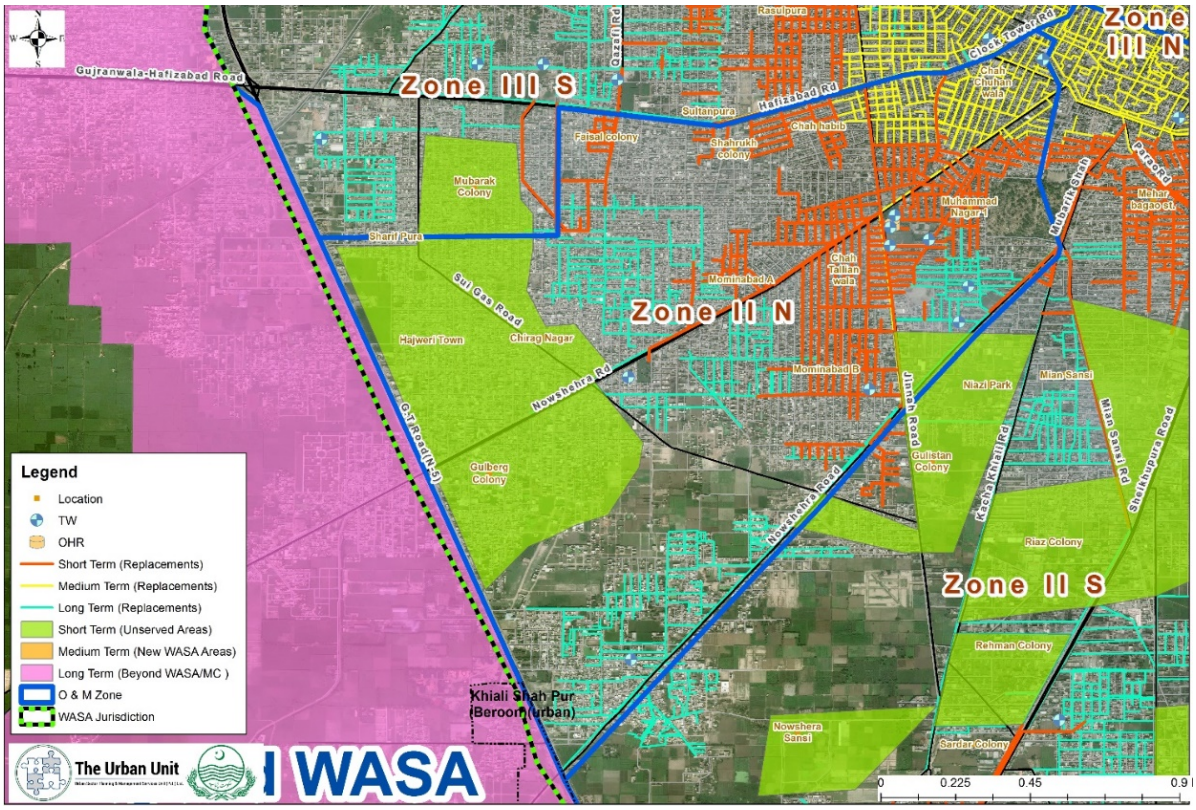


Figure 11: Rehabilitation and Expansion Pan of Zone – II (North)

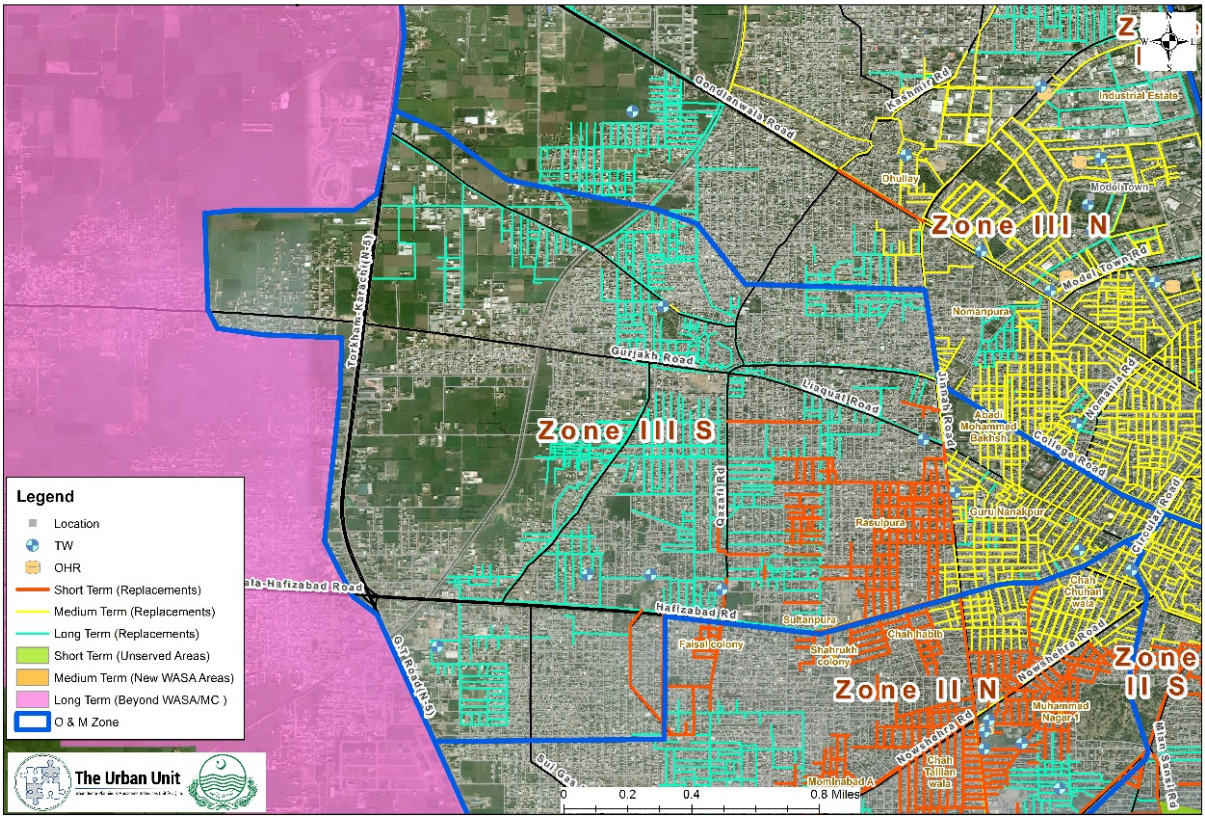


Figure 12: Rehabilitation and Expansion Plan of Zone – III (South)

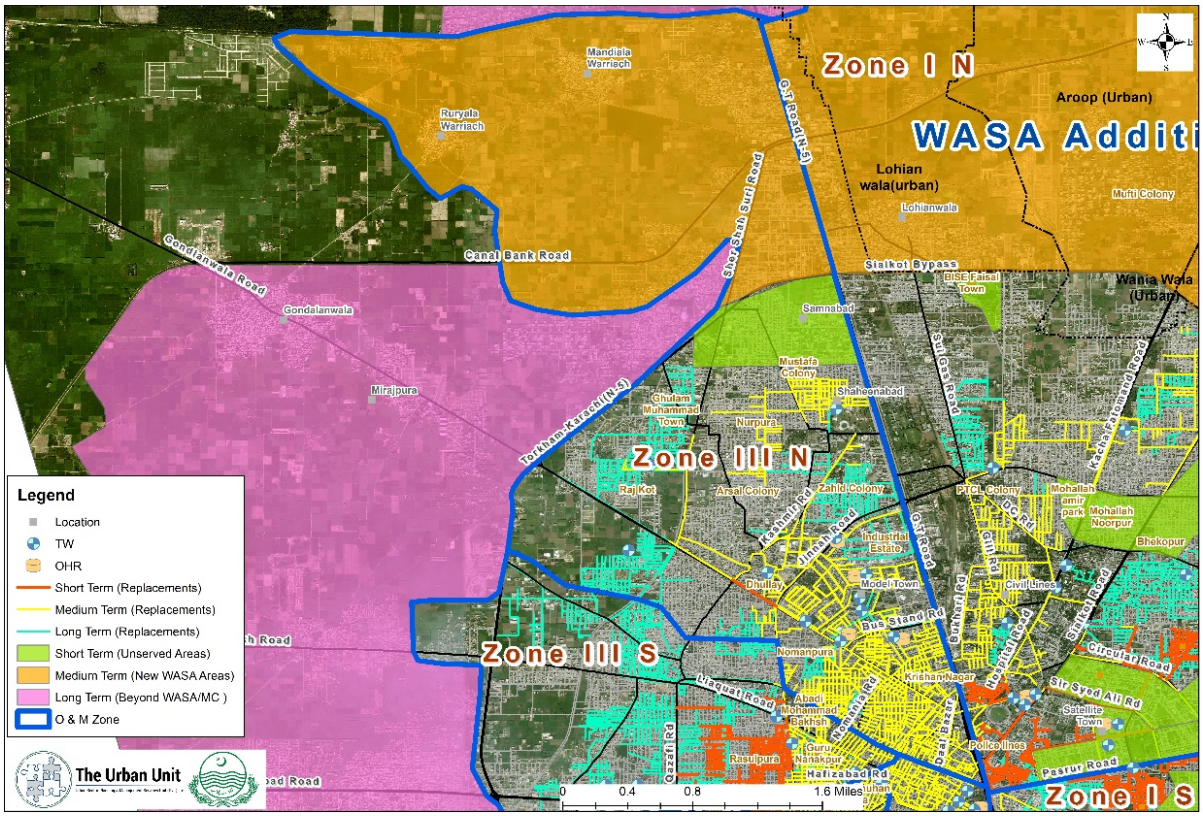


Figure 13: Rehabilitation and Expansion Pan of Zone – III (North)

Sewerage

Sewerage System

Gujranwala has a combined sewerage and storm drainage system. The jurisdiction of Water and Sanitation Agency (WASA) Gujranwala, the entity responsible for handling and disposal of sewerage and drainage in the city is over 162.2 square kilometer with total population of around 2,527,898 persons. The WASA Gujranwala sewerage infrastructure currently covers 70% (112 sq km) of the jurisdiction area with a sewerage network of 1180 Km sewer lines of 12-72 inch diameter with 36 disposal stations. Only 56% (1,418,900) of the population is served by the sewerage network therefore provision of sewerage services to 44% of the population is currently one of the main challenge.

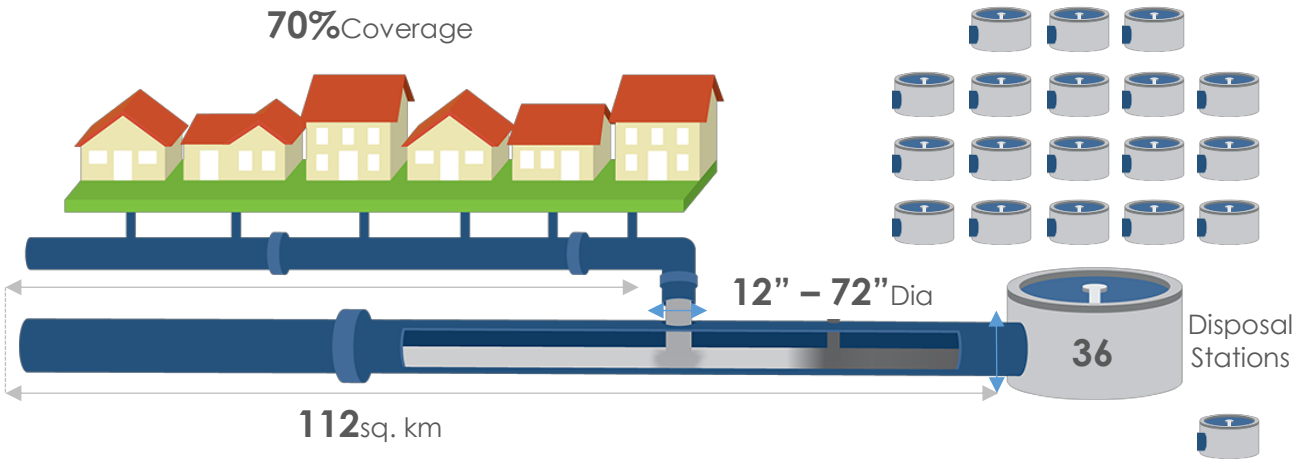


Figure 14: Sewerage Network in Gujranwala City

4.1. Current State of Sewerage System

4.1.1. Existing State of Infrastructure (Condition Assessment)

The sewerage system of the city is divided into three main zones and six subzones. The LG&CD Department Punjab vide notification number SOR(LG)44-4/2015 dated February 16, 2017 included 09 additional UC in Gujranwala Municipal Corporation and WASA Gujranwala jurisdiction. Subsequently the WASA jurisdiction area has increased from 64 sq km to 162.2 sq km. The condition assessment of these sewerage lines was carried out under Punjab Cities Governance Improvement Project (PCGIP) in 2016, which has been summarized below:

Table 12: Condition Assessment of Sewerage Lines

Condition	Sewerage Line Length (KM)	Percentage (%)
Previous Jurisdiction (64 sq km)		
A	836	59 %
B	152	18%
C	192	23%
Total	1180	100%

Following new UC's are added in the jurisdiction of WASA Gujranwala and their current situation is as follows:

1. UC 65 Lohianwala

   Located in North Western side of the city at Eastern side of GT road near the Mandiala Waraich, the total area of this UC is 1489 acre with total population of 37,415 persons as per 2017 census. Sewerage infrastructure is present in 80% of the area with 21",18",12" and 9" dia RCC pipes and open drains. The sewerage network is connected to WASA's existing network trunk sewer.

2. UC 66 Mandiala Waraich

   Situated near the Cantonment area in North Western side of the city, the total area of this UC is 2332 acre with population of 30,125 persons as per the 2017 census. Almost 60% area of the UC has sewerage infrastructure which means that the water from these areas is disposed through Disposal Station while the remaining water from the 40% of the unserved areas goes untreated into open ponds.

3. UC 67 Aroop

   Located at East of UC Lohainwala, UC Aroop area is 3345 acres with 36,206 person population. Sewer Lines of 24", 27" and 30" dia RCC pipes are present in Aroop village that are connected with WASA Trunk sewer which is currently being constructed.

4. UC 68 Wania Wala

   The UC is located at East of UC Aroop, the area of this UC is around 5,375 acres with population of 35,193 persons. The Upper Chenab Canal passes through middle of this UC. Very small area of this UC has RCC Sewer pipe network and open drains are used for disposal of sewerage in ponding areas outside villages and in sem nullah that ends up in Upper Chenab Canal.

5. UC 69 Jandiala Baghwala

   It is situated in Eastern side of Gujranwala city and on the left bank of Upper Chenab Canal. The total area of this UC is around 2179 acres with total population of 27,879 persons. Open drains are primarily used for disposal for sewerage in this UC.

6. UC 70 Rakh Kikranwali

   UC 70 is southern neighbor of UC 69 Jandiala Baghwala. The total area of this UC is 1876 acres with total population of 33,786 persons. RCC Sewerage system is present in this UC and water is disposed through trunk sewer line to Khawah minor through a disposal station.

7. UC 71 Khiali Shahpur / Their Sansi

   Located at Southern side of Gujrwanwala city, the total area of this UC is 2249 acres with population of around 37,385 persons. The majority area of this UC is urban residential and many private housing societies are present in this UC which administer their own sewerage infrastructure and dispose waste water in Main Drain. The Industrial Estate II is also situated in this UC which is discharging effluent directly in the Main Drain.

8. UC 72 Kohluwala

   The UC is situated at the sourthern side of UC 71 on the right bank of Upper Chenab Canal. The total area of this UC is 2312 acre with population of 34,484 persons. The sewerage system present in the area comprises of 24" and 18" dia main sewer lines. Some private housing colonies are also present in the UC which dispose water directly in Adhu Rai Drain.

9. UC 73 Adhu Rai

Located at Southern side of Kohluwala on both sides of Upper Chenab Canal, the total area of this UC is 2898 acres with population of 27,049 persons. Sewerage network of RCC pipes is present on left bank of canal; however, the right bank side areas has open drains which goes into nearby irrigation channels.

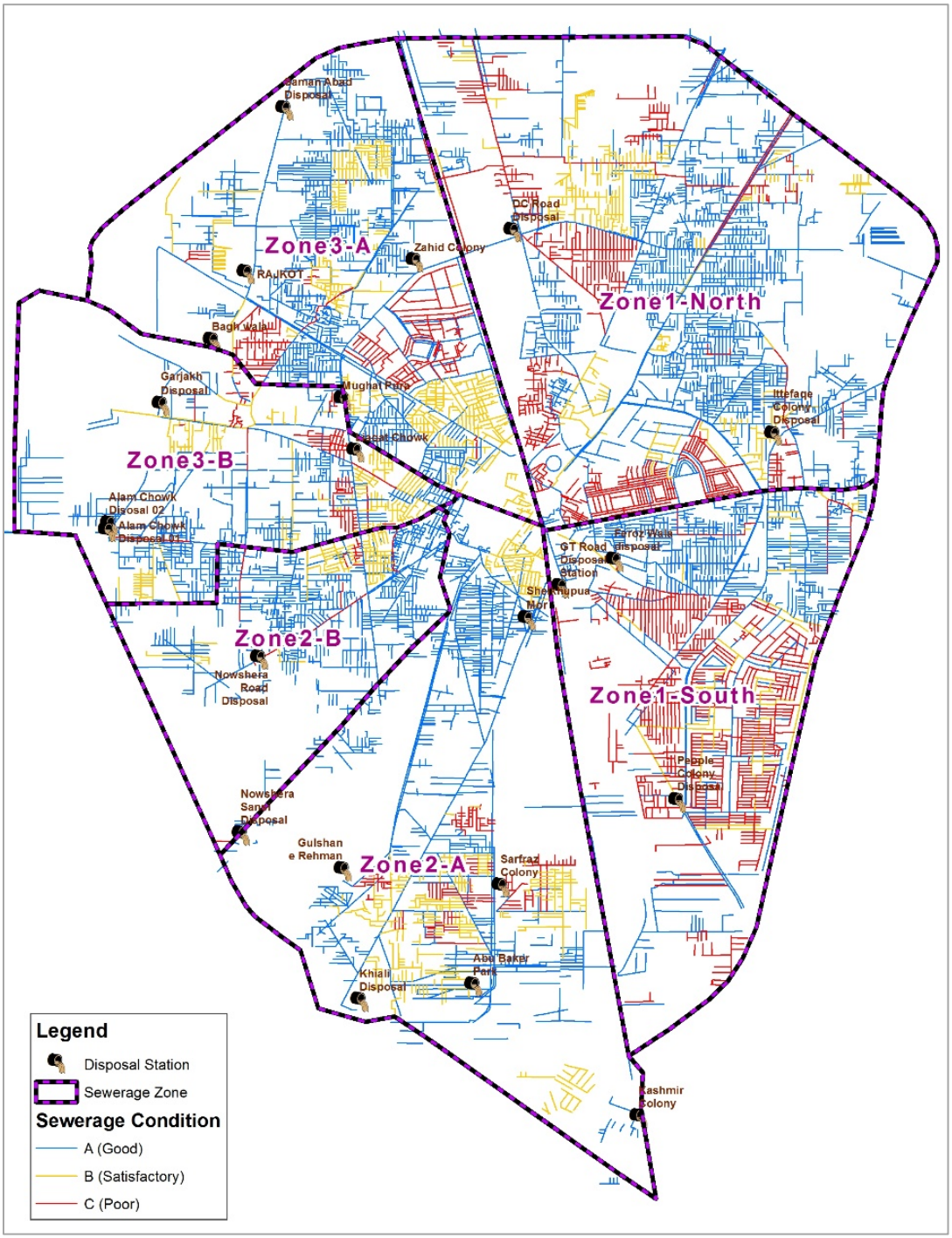


Figure 15: Sewerage Condition Map of Gujranwala City

4.1.2. Main Drains

Following are the major drains of Gujranwala which primarily are intended for drainage of storm water however the same are also used as sewerage effluent. These drains are open for 34 KM of length and this has become a crucial reason behind environmental degeneration, especially in dry seasons when only sewage water flows through them causing an extremely unpleasant odour. The drains are covered for 20 KM of length.

- Main Drain
- Jinnah Drain
- Mir Shikaran Drain
- Qila Mian Singh Drain
- Alipur Drain
- Adhu Rai Drain

The wastewater from these drains is discharged in Qadirabad Baloki Link Canal in West and Khod Drain in South.

Gujranwala has a plain terrain without any topographical diversity. The sewerage system in the city is laid on minimal slopes to maintain the self-cleaning velocity. Despite this, 36 disposal / lift stations are being operated in the city to lift the sewage and dispose it in the drains. The list of disposal stations operated by WASA Gujranwala is as follow:

Table 13: Disposal Stations of WASA - G

Sr	Disposal Station	No of Pumping Sets	Capacity (Cusec)	Disposal
1	Ferozwala Road	1	5	Main Drain
2	GT Road	5	50	
3	Haidery Road Underpass	1	3	
4	Muslim Road	1	5	
5	Peoples Colony	11	110	
6	Peoples Colony Underpass	1	5	
7	Ittefaq Colony	1	5	
8	Commissioner Road	1	5	
9	Sarfaraz Colony	1	10	
10	Abu Bakar Park	7	70	
11	Khiali	10	105	
12	Kashmir Colony	3	15	
13	Rakh Kikran Wali	4	20	
14	Kohlu Wala	2	6	
15	Fransisabad	2	10	
16	Jaleel Town	2	10	
17	Madina Colony (Jinnah Road)	2	10	Jinnah Drain
18	Jinnah Road (DC Road)	2	10	
19	Jinnah Road Underpass	1	3	
20	Zahid Colony	3	10	
21	Model Town	1	5	
22	Dhullay Chowk	3	15	
23	Mughal Pura	3	9	
24	Islamia College Chowk	1	5	

Sr	Disposal Station	No of Pumping Sets	Capacity (Cusec)	Disposal
25	Gulshan e Rehman	3	11	
26	Nowshera Sansi	5	60	
27	Pipli Wala	3	30	
28	Samanabad	4	35	Qila Mian
29	Rajkot	11	125	Singh Drain
30	Baghwala	2	10	
31	Gerjakh	2	20	
32	Bhaat Colony	1	3	
33	Alam Chowk 1	3	30	
34	Alam Chowk 2	3	30	
35	Nowshera Road	3	30	Mir Shikran
36	Awan Chowk	3	25	Drain
	Total	110	910	

4.1.3. WWTPs

Currently no Waste Water Treatment Plant is present in Gujranwala and untreated water is disposed directly in QB Link Canal in West and Khod Drain in South. 3 treatment plants are under consideration by WASA Gujranwala and their details are as follow as per JERS Study of 2020 for WASA Gujranwala.

Table 14: Disposal Stations of WASA - G

Catchment Zone	Area		2020		2044	
	(Sq Km)	%	Population (Million)	Flow MGD	Population (Million)	Flow MGD
Zone-1	96.01	59	2,328,769	93.15	4,299,820	**171.99**
Zone-2	49.8	31	150,994	6.04	278,794	**11.15**
Zone-3	16.4	10	48,134	1.93	88,874	**3.55**

The comparison between different proposed technologies is as follow:

Table 15: Zone Wise Comparison of Proposed WWTPs Technologies

Treatment technology	Zone-1			Zone-2			Zone-3		
	CAPEX (Rs Mill)	OPEX (Rs Mill)	Land (Acre)	CAPEX (Rs Mill)	OPEX (Rs Mill)	Land (Acre)	CAPEX (Rs Mill)	OPEX (Rs Mill)	Land (Acre)
WSP	7,827	43	1771	508	3	136	162	1	55
AL	9,250	2090	956	600	136	62	191	43	20
TF	17,077	960	531	1107	62	34	353	20	11
UASB	21,108	653	319	1369	43	21	436	14	7
OD	17,077	3470	425	1107	225	28	353	71	9
ASP	23,717	2744	319	1538	178	21	490	57	7

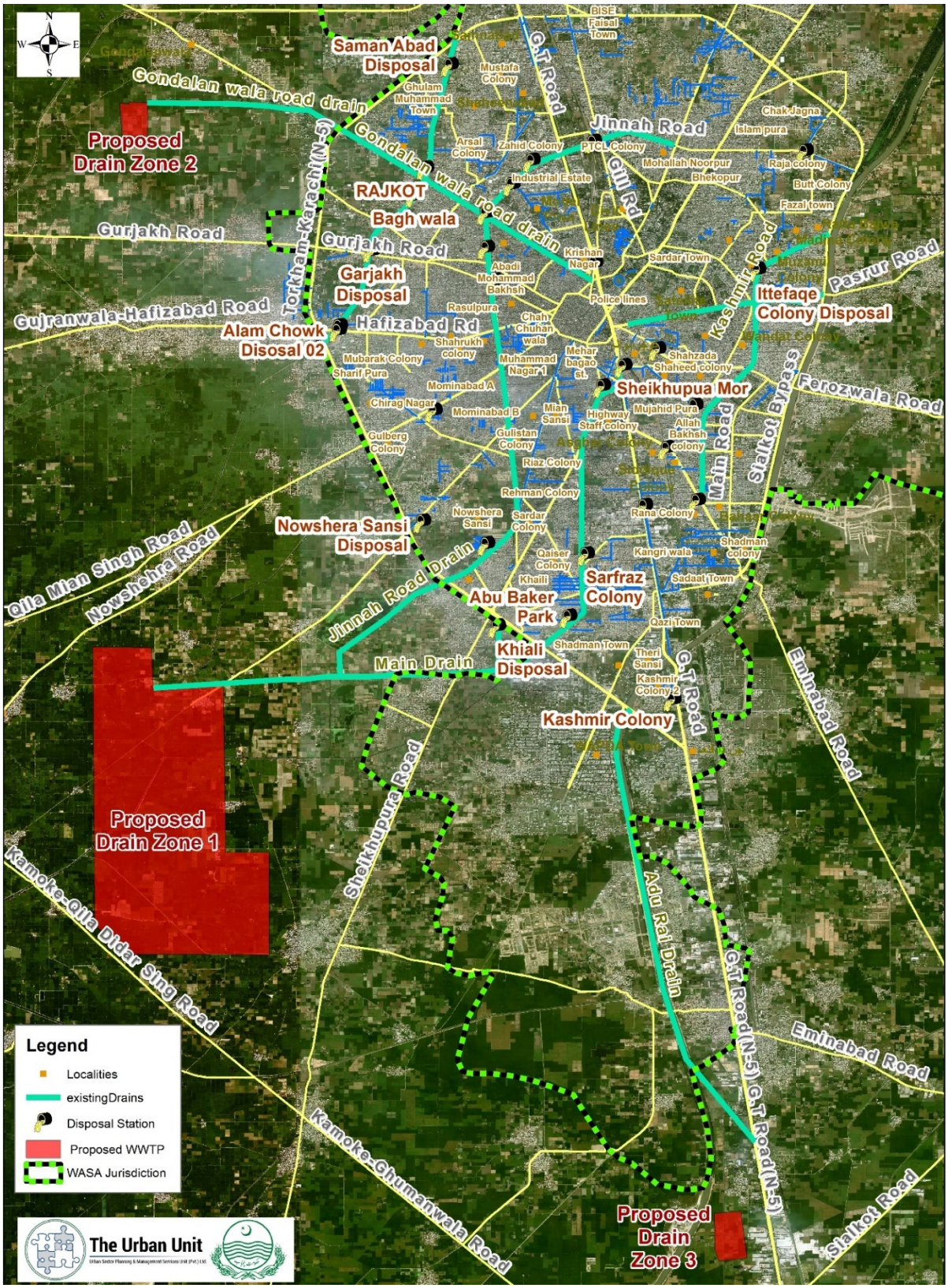
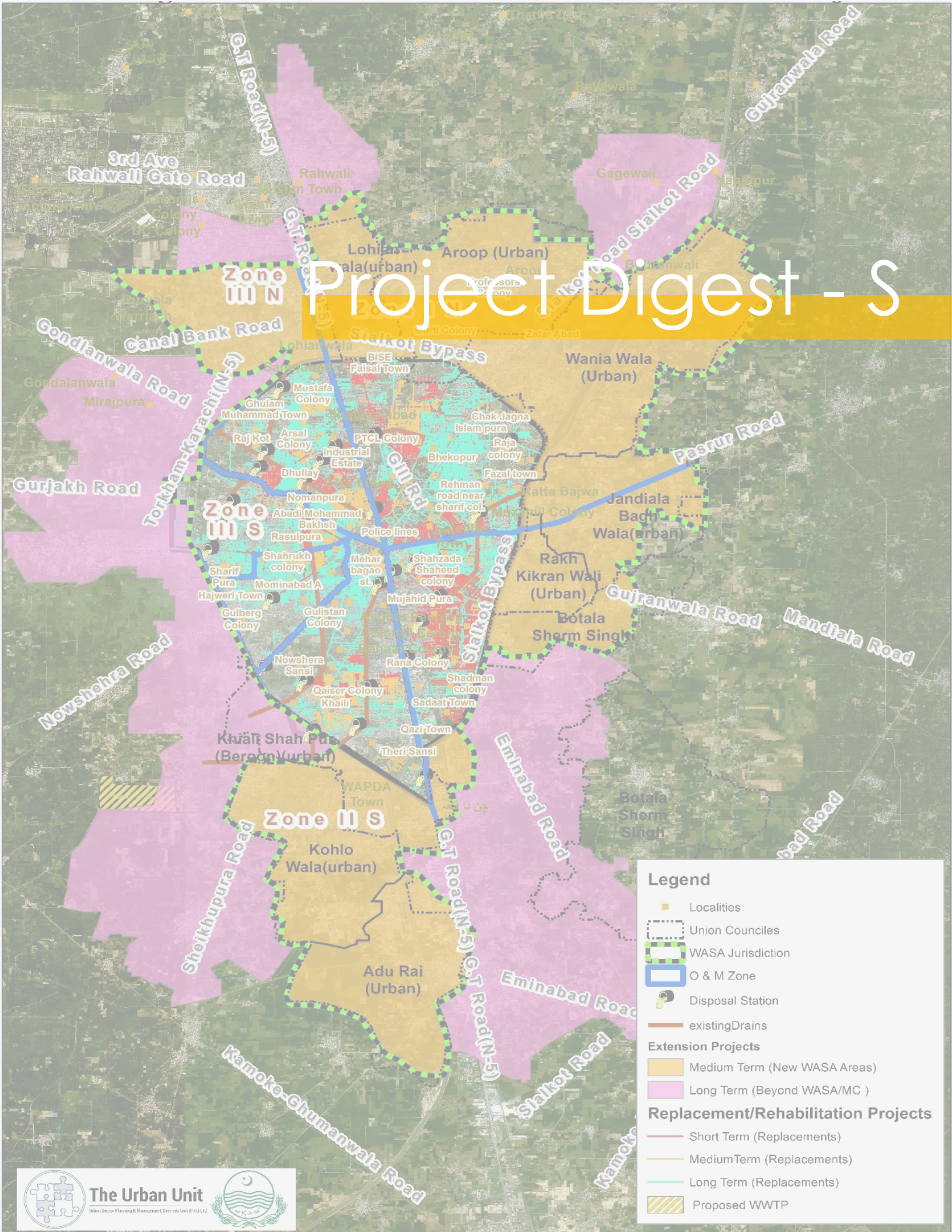


Figure 16: Proposed Location of WWTP


Project Digest - S
Zone III N
Zone III S
Zone II S
Lohian Wala(urban)
Aroop (Urban)
Wania Wala (Urban)
Jandiala Bagh Wala(urban)
Rakh Kikran Wali (Urban)
Botala Sherm Singh
Khiali Shah Pur (Beroon)(urban)
Kohlo Wala(urban)
Adu Rai (Urban)
Gondlanwala Road
Canal Bank Road
Torkham-Karachi(N-5)
Gurjakh Road
Nowshehra Road
Sheikhupura Road
Kamoke-Ghumanwala Road
Sialkot Bypass
Gill Rd
Pasrur Road
Gujranwala Road
Mandiala Road
Eminabad Road
Sialkot Road
G.T Road(N-5)
3rd Ave Rahwali Gate Road
Legend
Localities
Union Counciles
WASA Jurisdiction
O & M Zone
Disposal Station
existingDrains
Extension Projects
Medium Term (New WASA Areas)
Long Term (Beyond WASA/MC)
Replacement/Rehabilitation Projects
Short Term (Replacements)
MediumTerm (Replacements)
Long Term (Replacements)
Proposed WWTP
The Urban Unit

Project Digest - S

5.1. Analysis of on-going / up-coming schemes

Major ongoing projects of sewerage system:

- **Construction of Trunk Sewer Along bypass Road:**

  Trunk Sewer line along Bypass Road to cater 4 additional UCs (Wania Wala, Aroop, Lohianwala, Mandiala Waraich) in Northern side of the city. The 30 inch dia trunk sewer laid 30 feet deep in UC Wania Wala and it converts into 48 inch dia and 54 inch dia as it caters the sewage flows from UCs of Aroop and Lohainwala. Finally after collecting flow of UC Mandiala Waraich the trunk sewer converts into 60 inch dia that will carry the sewage into a new disposal station near Al-Mujeeb Town, Ali Pur Road from where it will be pumped to discharge into Ali Pur Drain.

- **Construction of RCC conduit parallel to Mian Singh Minor:**

  Mian Sing minor is an irrigation channel that originates from Lohianwala Distributory. This minor has been catering the sewage flow of about 2200 (8.9 sq km) of Gujranwala City. The project has been initiated with objective of separation of sewage from irrigation water. The project's scope is inclusive of construction of an RCC conduit parallel to the Mian Singh Minor for a length of 10,797 Rft (3.29 KM).

- **Sewerage System of Eimanabad:**

  Laying of RCC Sewer, PCC in streets and Construction of Disposal Station in Eimanabad Gharbi UC73 for improvement of sewerage infrastructure in the area.

5.2. Proposed Projects

Around 16% of the existing sewerage system in various zones across the cities is in poor condition (C) and required immediate intervention. 13% of these pipes will require replacement in medium term time and the remaining 71% will require replacement in long term.

The replacement of these pipes with poor condition (C) is proposed to be taken as priority project and are listed in Short Term projects. Similarly extension of sewerage system coverage in the newly added UC's i.e. unserved areas in the jurisdiction of WASA and their integration with the main sewage system is also a major intervention. The disposal stations of WASAs will also require upgradation and rehabilitation and the key updates required are mentioned in the projects list.

Currently, no Waste Water Treatment Plant is operated by WASA Gujranwala and all sewage goes directly into QB Link canal through the drains. Three waste water treatment plants are currently under consideration by WASA, it is proposed that the Zone-III plant is to be constructed within the Short Term period while the Zone-I and Zone III may be constructed in medium and long term time period.

The proposed projects are listed in the table below along with cost and are also illustrated in the figure below.

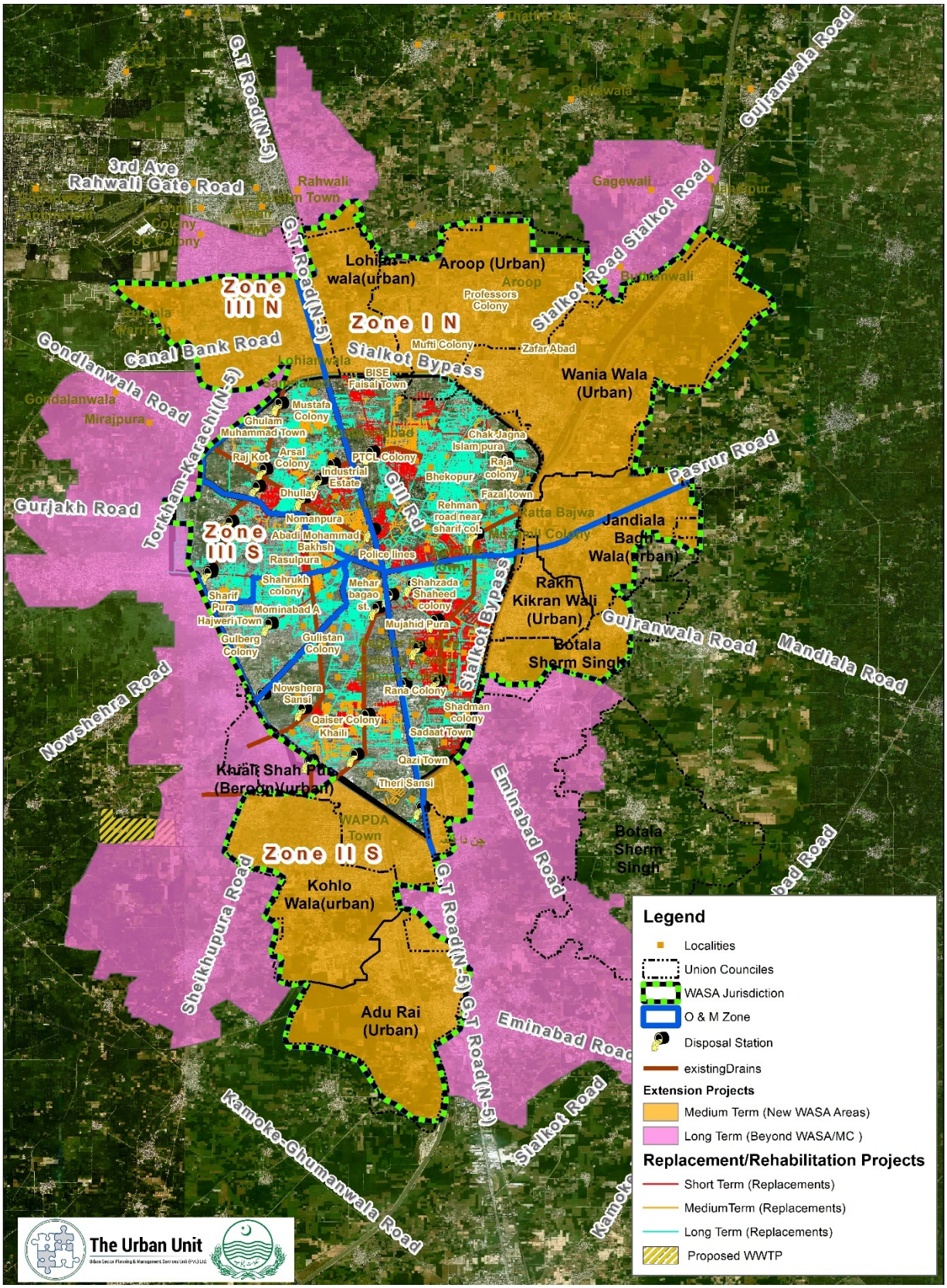


Figure 17: Sewerage Rehabilitation and Extension Projects

5.2.1. Short Term (up to 3 years)

Sr.	Zone	Areas	Scope	Cost (PKR Million)
1	Zone 1N	Satellite Town, Civil Lines, PTCL Colony and Amir Park, Bilal Town, Faisal Town	Replacement of RCC Pipes of 12", 15", 18", 21", 24",27",30",36",42",48",54" dia.	210.83
2	Zone 1S	Peoples Colony, Sehzada Shaheed Colony, Faqirpura, Miran je Town, Nabi Pura	Replacement of RCC Pipes of 12", 15", 18", 21", 24",27",30" dia	195.03
3	Zone 2S	Mohalla Shah ul Arfeen, Qaiser Colony, Khaili Shahpura	Replacement of RCC Pipes 12", 15" dia	32.74
4	Zone 2N	Mominabad, Mubarak Colony, Chah Habib	Replacement of RCC Pipes 15", 24",27",30",48" dia	31.78
5	Zone 3N	Model Town, Industrial Estate,Ali Ji Town, Muhammadpura	Replacement of RCC Pipes 12", 15", 24",27",30",34" dia	49.42
6	Zone 3S	Muslim Town, Rasulpura, Razabad	Replacement of RCC Pipes 12", 15", 24",26",48",60" dia	53.00
7	-	Rakh Kikranwali Disposal Station	Up gradation and Rehabilitation of Screening Chamber, Wet Well, Valve Chamber, Electrical Works and Force Main	253.34
8	-	Abdal Disposal Station	Up gradation and Rehabilitation of Screening Chamber, Wet Well, Valve Chamber, Electrical Works and Force Main	77.207
9	-	Ruryala Waraich Disposal Station	Up gradation and Rehabilitation of Screening Chamber, Wet Well, Valve Chamber, Electrical Works and Force Main	69.849
10	-	GT Toad Coca Cola to Sheikhupura Road	Construction of RCC Drain	395.00
11	-	Jaleel Town	Construction of RCC Drain	376.80
12	-	Misc	Provision of Sucker Machine, Jetting Machines, Tractors and Clampshells for Sewerage and Drainage Services	145.00
13	-	Adhu Rai, Kohluwala	Construction of 3.55 MGD WWTP -3 (Waste Stabilization Ponds) including land acquisition.	162.00
			Sub-Total	2,052

5.2.2. Medium Term (3 to 5 years)

Sr.	Zone	Areas	Scope	Cost (PKR Million)
1	Zone 1N	Chah Gorewala, Madina Colony, Imran Colony, Chatha Colony	Replacement of RCC Pipes 12", 15", 18", 21", 24",30",36"	101.53
2	Zone 1S	Peoples Colony, Shezada Saheed Colony,	Replacement ofRCC Pipes 12", 15", 18", 27",30",36"	56.74
3	Zone 2S	Bakhtaywala, Muhammadi Town,	Replacement ofRCC Pipes 12", 15", 18", 21", 24"	100.41
4	Zone 2N	Chah Chuhanwala	Replacement ofRCC Pipes 12", 15", 18", 24",27"	25.90
5	Zone 3N	Krishan Nagar, Raitanwala, Shaheenabad, Nurpura, Rajkot	Replacement of RCC Pipes 12", 14",15", 18", 24",27",36",48"	104.22
6	Zone 3S	Hasanpura	Replacement of RCC Pipes 12", 15", 18", 21", 24",27",30",42",60"	60.64
7	Newly added UC's	Mandiala Waraich, Lohainwala, Wania Wala,	Installation of Sewerage System with RCC Pipes 18", 21", 24", 27",30",36",42",48" and 54" dia	85.16
8	-	Mandiala Waraich Diposal Station	Up gradation and Rehabilitation of Screening Chamber, Wet Well, Valve Chamber, Electrical Works and Force Main	147.72
9	-	Kohluwala Disposal Station	Up gradation and Rehabilitation of Screening Chamber, Wet Well, Valve Chamber, Electrical Works and Force Main	79.70
10	-	Adhu Rai Diposal Station	Up gradation and Rehabilitation of Screening Chamber, Wet Well, Valve Chamber, Electrical Works and Force Main	94.86
11	-	Qila Nood Singh Diposal Station	Up gradation and Rehabilitation of Screening Chamber, Wet Well, Valve Chamber, Electrical Works and Force Main	118.53
12	-	Main Drain, Jinnah Drain, Qila Mian Singh Drain, Mir Shakran Drain, JandialaBaghwala, Rakh Kikranwali, Khiali Shapur and Kohluwala	Construction of 172 MGD Main WWTP-1 (Waste Stabilization Ponds) including land acquisition.	7,800.00
			Sub-Total	8,775

5.2.3. Long Term (5 to 10 years)

Sr.	Zone	Areas	Scope	Cost (PKR Million)
1	Zone 1N	Salim Colony, Majid Colony, Chicherwali, Qasim Town,Tariqabad, Nursery Town, Raja Colony, Noorpur, Quaid-e-Azam, Mukhtar Colony, Usman Colony, Gulshan Town	Replacement of RCC Pipes 12", 15", 18", 21", 24",27",30",36",42",60"	493.49
2	Zone 1S	Mohalla Chaman Shah, Wahdat Colony, Fareed Town, Muhammad Pura, Faqirpura	Replacement of RCC Pipes 12", 15", 18", 21", 24",30",36",42",54",60"	309.19
3	Zone 2S	Mohalla Muhammad Pura, Nazir Park, Riaz Colony	Replacement of RCC Pipes 12", 15", 18", 21", 24",27",30",36",40",48",54",60",72"	340.79
4	Zone 2N	Hajweri Town, Mubarak Colony,Mominabad	Replacement of RCC Pipes 12", 15", 18", 21", 24",27",30",36",40",48",54",60"	247.21
5	Zone 3N	Samnabad, Nurpura, Khokar Colony, Arsal Colony, Sidique Akbar Town, Zahid Colony	Replacement of RCC Pipes 12",13", 15", 18", 21", 24",27",30",36",40",42",48",54",60"	448.70
6	Zone 3S	Faisal Colony, Mubarak Colony, Kotli Rustam, Muslim Town	RCC Pipes 12",15", 18", 21", 24",26",27",30",36",40",42",48",54" ,60"	243.59
7	-	Mandiala Waraich, Lohainwala, Aroop and Wania Wala	Construction of 11.15 MGD WWTP-2 (Waste Stabilization Ponds) including land acquisition.	508
			Sub-Total	2,591

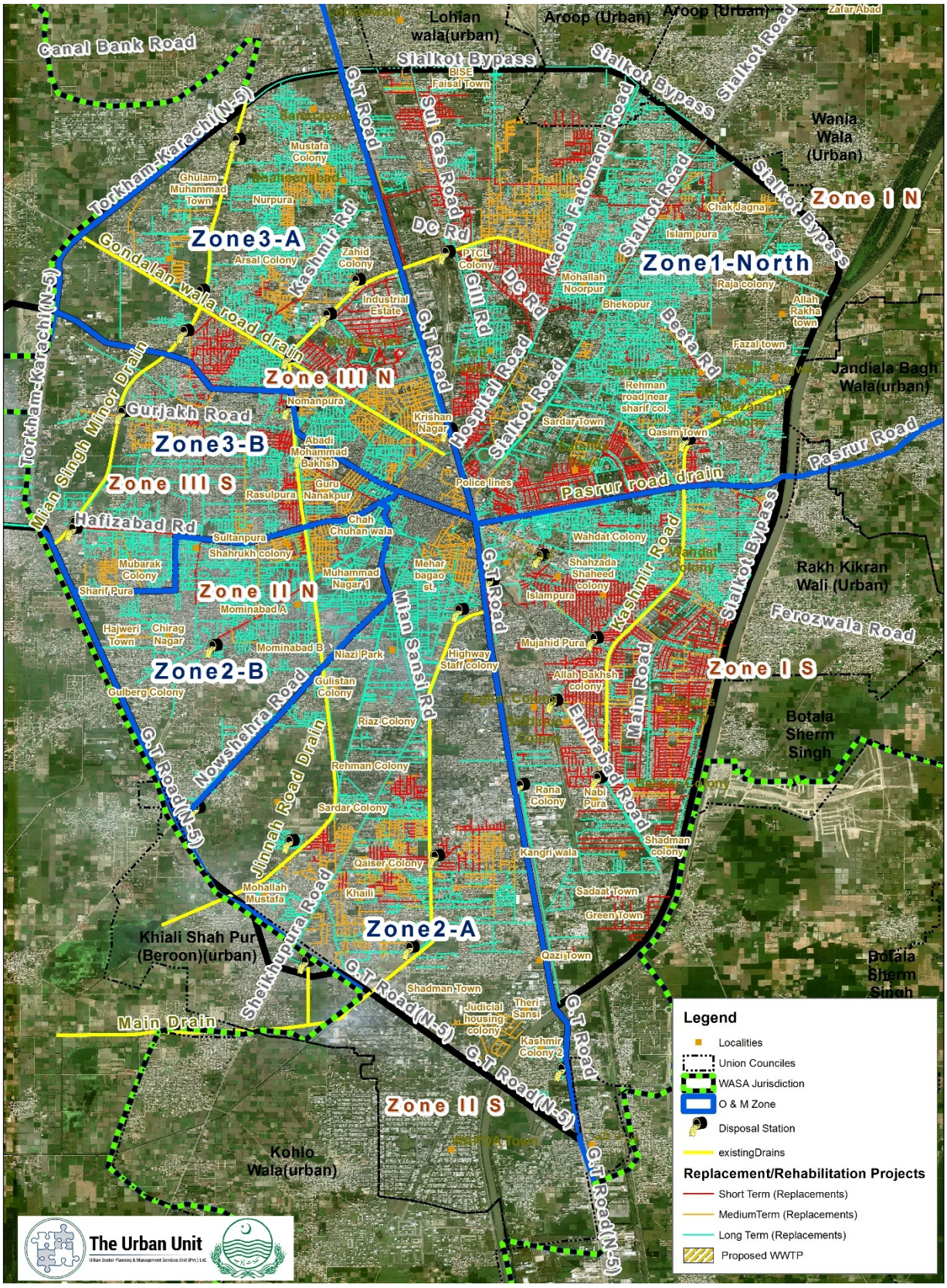


Figure 18: Sewerage Rehabilitation Projects

Environment

Environment and Public Parks

6.1 Current State of E&PP

6.1.1 Air Quality

The degradation of air quality in Gujranwala city is a major environmental concern these days. Air pollution levels in urban centers have either crossed safe limits given in the NEQS or have reached the threshold values. About 60 to 70 % of the deterioration in the air quality is due to the vehicular emissions. The parameters which have proved to be the major threat are particulate matter and concentration of oxides of nitrogen that are also relatively higher in all the large cities of Punjab.

Further the present road infrastructure cannot cater to the need of growing automobiles flow resulting in the mounting concentrations of NOx and SO2. In short, there is a dire need to adopt strict measures to obviate this issue, which is not only a hazard for the environment but also to the health and quality of life of the people.

6.1.2 Soil Quality

According to Soil and Water Testing Research Laboratory, 35% of the Gujranwala land has degraded soil reaching the pH/alkalinity value to around 8.50. The soil lacks the basic nutrients like nitrogen, potash and phosphorous by 90%, 30% and 85% respectively which in turn decelerates the growth of plants[16].

6.1.3 Flora and Fauna

Along the canal segment, most of the **trees** are eucalypts. Other species include Sheesham (Dilbergia sisoo), Keekar (Acacia arabica), Peeloo (Salvadora persica), Bohar (Ficus religiosa), Gaz (Tamarix indica), Nim (Azadrichta indica), and Mesquite (Prosopis juliflora). Eucalypts and Mesquite are exotic species and mesquite has suppressed endemic species to a great extent. The endemic species of Peeloo and Bohar are reported to be endangeredand similarly the wild berry (Zizyphus numularia) has almost become extinct.

Figure 19: Common Trees in Gujranwala District: Eucalyptus, Sheesham, Bohar, Keekar and Neem

[16] Pre-Investment Study District Gujranwala, 2009

Common **mammals** in the district are wild-bore hyaena (Hyaena striata), Red Indian foxes (Vulpes bengalensis) and porcupines and jackals (Canis aureus). Until a few years ago the wolf (Canis palfies) was also found in riverine forests but as of now the species has almost become extinct due to loss of forests.

Commonly found **birds** of the area are hawk (Accipiter badius cenchroides), kite (Milvus migrans govinda), parrot (Paleornis torquata), partridge (Fvancolinus pondoceraianus mecrranesis) and common crow (Corvidae splendens). A large variety of waterfowls and migratory birds also visit the region because of wetlands associated with barrages along the river systems of the area.

Reptilian and amphibian fauna is not well documented. However, local people have reported that snakes and lizards are common in the region.

Main **fish** species found in Canal are Gulfam (Cyprinus carpio), Rahoo (Lebeorohita sp) and Mohri (Crhinus miragata). In the month of January the canal is closed down for annual repair, maintenance and de-silting purposes. In this period fishing contracts are awarded and the contractors take the fish before the canal dries out. In this way the entire fish population in the canal is destroyed annually.

6.1.4 Cropping Pattern

Ever since the irrigation canal system was developed, cotton, rice, sugarcane and wheat have been the main crops. Cotton had always been the major cash crop earning foreign exchange for the country. Due to some serious pest/viral attack, farmers have sustained major losses and over the last decade, cotton cultivation has almost been replaced by maize. Currently, as many as three times maize crops per annum are being cultivated. Similarly, sugarcane cultivation has also displayed considerable decrease mainly due to pest infection and delayed payments to the growers by the sugar industry. Maize has equally replaced the sugarcane crop. Also large areas of land vacated by cotton and sugarcane have also been brought under potato cultivation.

Because of hot and humid weather, Gujranwala District is also famous for its fruit production, which includes mango, guava, banana, oranges and water-melons.

6.1.5 Landscape and Amenities

The city of Gujranwala has many places assigned under the parks and public amenity places mainly including Khawaja Ground, Sagheer Shaheed Park, Muhannadi Park, Ladies Park, Model Town, D-Park Sheranwala Bagh, Gulshan Park, Jinnah Park, Janat Bibi Park and Milad e Mustafa Park.

There city has got numerous significant archaeological/cultural sites like Nishan-e-Manzil, Jinnah Stadium, Gold's Gym, and Rail Bazaar etc. Because parks and social amenity areas are the public sharing spaces this makes them susceptible to environmental degradation.

Figure 20: Nishan-e-Manzil, Jinnah Stadium, Gulshan Park and Jinnah Park

Project Digest – E&PP

7.1. Air Quality Monitoring Mechanism for Gujranwala City

Cost: 30.0 Million

7.1.1. Scope:

1. The main objective of this Project is to generate background data of air quality, in order to assess the existing level of contamination in the city and to develop reliable air quality forecasting system that will analyze the possible effects of air contamination that may possibly occurring future.
2. In order to obtain a clear picture of the city, it is required that the critically polluted areas of Gujranwala city will be identified and monitoring must be carried out at different places as in to consider residential, industrial, and commercial areas for carrying out source differentiation. An example of installation of air quality monitors will be shown below:

Table 16: Current Development Portfolio of WSS of Gujranwala District

City	Proposed Site for Air Quality monitor installation	Coordinates		
Gujranwala	Gondlan wala Road	32.17262	74.172016	Roadside
Gujranwala	Mian Sansi Road	32.14162	74.174711	Roadside
Gujranwala	Near Hafizabad Road	32.15695	74.157369	City Block
Gujranwala	Chaman Shah Road	32.14368	74.204502	Residential
Gujranwala	G.T road	32.16112	74.188416	Roadside
Gujranwala		32.18655	74.202999	Residential

3. Four air pollutants viz., Sulphur Dioxide (SO_2), Oxides of Nitrogen as NO_2 and Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM/PM_{10}) will be identified for regular monitoring at proposed locations. The monitoring of few other meteorological parameters such as wind speed and direction, relative humidity and temperature will also be integrated within the system that will monitor air quality.
4. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with the frequency of being conducted twice a week.
5. Parameters that need to be assessed from various locations will be:
   - For Urban areas (nitrogen oxides, PM_{10}, aerosol particles and sulfur dioxide (optional));
   - For Industrial / Residential areas (nitrogen oxides, sulfur dioxide, aerosol particles and possibly other compound-specific ammonia or volatile organic compounds);
   - For Traffic Station (nitrogen oxides, carbon monoxide, aerosol particles, volatile organic compounds (benzene) and sulfur dioxide (optional)).
6. The information obtained will help to satisfy variety of purposes including monitoring compliance with the PEQS/WHO, public reporting of the Air Quality Index (AQI), assessing population exposure and potential risks from air toxics, determining pollution trends, monitoring specific emissions sources, investigating background conditions, and evaluating computer models.

7. Once rigorous monitoring will be done, different numerical and statistical models (including models of dispersion and meteorological forecasting models) will be applied. The obtained results will be generated graphically that will be easier to understand for all the users and public

Moreover, the database generated from air quality sensors will be used by authorities to devise strategies to combat air pollution and to study the environmental impacts on human health and other living/non-living objects.

Figure 21: An example of Air Quality Monitoring Network

7.2. Urban Forestry Plan for Gujranwala City

Cost: 35.0 M

7.2.1. Scope:

1. Develop baseline data of Gujranwala city by mapping and assessing of city's urban tree count and canopy cover by using high resolution satellite image. The database will be stored as geo-database with detailed classification level at Site, Locality, Society, UC, Tehsil level etc.
2. Identify trends of tree cover change of city through temporal mapping of tree cover by using historic satellite image. An example of Lahore is shown in the figure.
3. Gujranwala city's tree count, density, positive and negative hotspot will be identified by using ground and space borne data sources. Moreover, random sampling survey (20%) will be conducted to check and ensure completeness and accuracy of information.

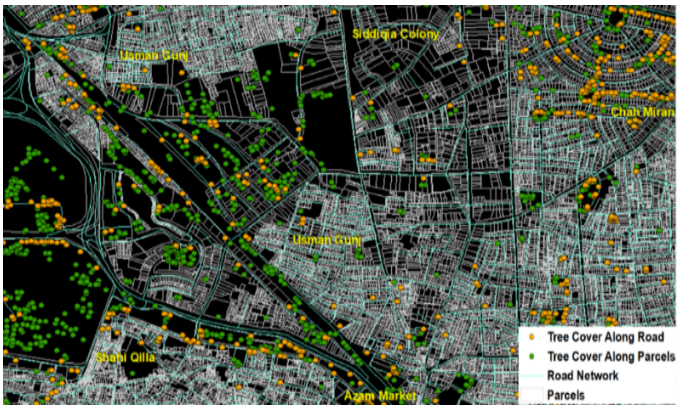


Figure 22: An example of Tree Count Mapping

4. Based on updated and complete inventory data of tree cover, identify potential plantation/restoration sites, while particular focus will be in planting of areas which are classified as areas of High priority or areas that are more prone to deforestation in near future.
5. Develop a Mini–Forestry Master plan for different areas of the city.

6. Create and maintain a list of recommended or suitable native and exotic tree species for tree plantation and geo tagging each plantation activity.
7. A dashboard will be developed supported with spatial data that will enable immediate access and generate quick responses for a specific query about the new plantation sites and the past data.

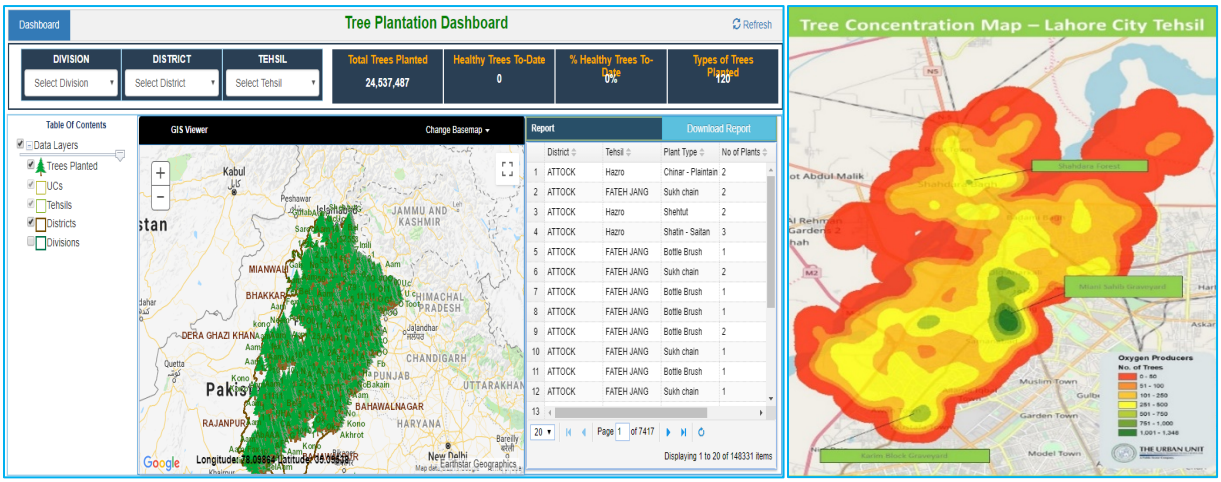


Figure 23: An example of Tree Plantation Dash Board and Tree Concentration Map

8. Prepare an ICT based monitoring module that can be used for regular monitoring of plant protection, regeneration, health of plants and work progress and thereby improve accountability and transparency.

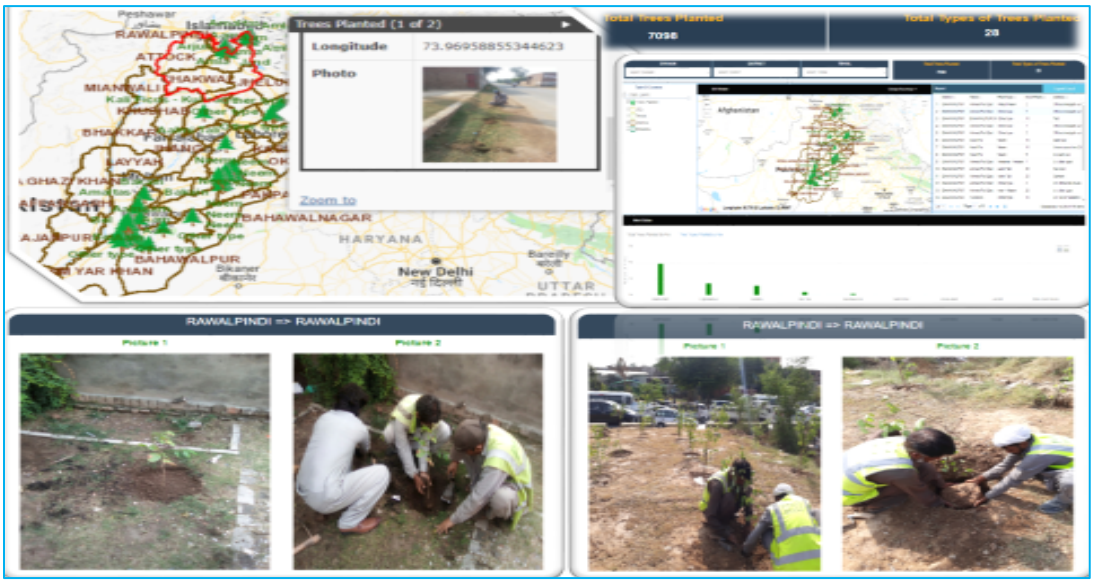


Figure 24: ICT Based Monitoring Dashboard for Urban Forest

7.3. Ecological Tourism Plan for Head Qadirabad

Cost: 30.0 M

7.3.1. Scope:

1. Tourism is one of the key sources for generation of GDP in the region, however, the transport and associated factors with it result in increased carbon footprint. This proposal aims to suggest measures for increasing tourism in the region while reducing the carbon footprint and cluttering of the region.
2. Ensure the public can enjoy a wide range of recreational and tourism experiences across the Game Reserve by;
    - Maintaining access at a range of standards (safe accommodation and sighting points)
    - Providing quality facilities, information and interpretive services
3. The tourism will be enhanced in the area by providing various visitor-facilities such as:
    - Activity departure points
    - Accommodation
    - Sighting points
    - Visitor information centers
    - Restaurants
    - Information sign boards
    - Riverside proper seating facility
    - Children play areas

This effort will also generate revenue of the locals.

4. Upgrade and maintain existing infrastructure facilities inside the game reserve which includes road network and walking trials in compliance with zonation.
5. Create a dashboard or other channel and improve our understanding about the game reserve (particularly species count, their habitat, challenges faced by the species) through innovative collection and sharing of community knowledge, scientific research and monitoring.

Figure 25: An Example of Species Dashboard[17]

[17] Source: www.birdlife.org

6. Many headwater streams are arising within the Game Reserve which, if managed properly, will contribute to improve aquatic ecosystem services related to flow of good quality water to surrounding landscapes for various livelihood benefits. Therefore, water quality assessment of such headwater streams will be conducted and monitored biannually.

7.4. Parks Improvement and Management Initiatives

Cost: 80.0 M

7.4.1. Scope:

1. There are 27 functional and 10 non-functional parks in Gujranwala city, covering total area of about 107.47 acres.
2. Parks Management Plan of Gujranwala will be developed after reviewing the past and projected recreation, leisure and other relevant trends, Parks management instructions and strategic direction for the acquisition, design, construction, maintenance, preservation and animation (or use) of parks. After formalization of Parks Improvement Plan, an Internal and external stakeholder will be invited to provide feedback on the draft plan.
3. However, few Initiatives that would be taken for Parks Improvement and Management includes:
    - Adding new greenery, lighting and other facilities
    - Replace damaged concrete at picnic shelter and replace damaged picnic tables.
    - Repair damaged turf as needed.
    - Increase public access.
    - Add shade structure.
    - Add security cameras.
    - Replace walkways.
    - Replace play structure.
    - Add drinking station.
    - Repair park fencing.
4. Some additional features in community parks with entertainment potential for picnickers would include:
    - Covered and open eating areas
    - Barbecue pits
    - Benches
    - Athletic fields
    - Gazebos
    - Stages and theatrical venues
5. There is only one Ladies Park in Gujranwala. Among other specific changes in parks renovation, it is suggested to outfit an Exercise station there exclusively for females.
6. There are 03 fun land parks in Gujranwala city. These fun lands can be improved by adding multiple swings, slides, water play features, climbing structures, a large cement area for basketball and skating and other equipment. For toddlers, some area of the parks will be spared with gated fencing, soft flooring and jumping castle equipment.
7. Environmental awareness among the community would be improved from parks by:
    - Labeling different plants and trees of the parks with informative placards.

- Include recycling stations throughout the park with dedicated bins for plastics, paper and glass.
- Sponsor park-wide cleanups that involve everyone within the community

8. Mobilize local community to visit the parks by organizing different cultural festivals, gardening activities and educational trips in the parks.
9. Develop an Evaluation Tool for parks which is intended to help inform park managers about baseline park information that can be used for further investigation and decision-making. The tool can also document and track small park encroachment and develop strategies for consistent enforcement and monitoring.

7.5. Eco-revitalization of Gujranwala Nullahs crossing within the city

Cost: 50.0 M

7.5.1. Scope:

1. **Landscaping of Gujranwala Main Drain or Nullah which includes following activities:**
   - Re-vegetation
   - Construction of various visitor attractions such as gardens, walking tracks, observation platforms, raised observation deck, cycling trail, Riparian vegetation,
   - Green belt along the road
   - Footpath along the road etc.
   - A small rest center for visitors where meals can be eaten, bicycles rented and trips booked

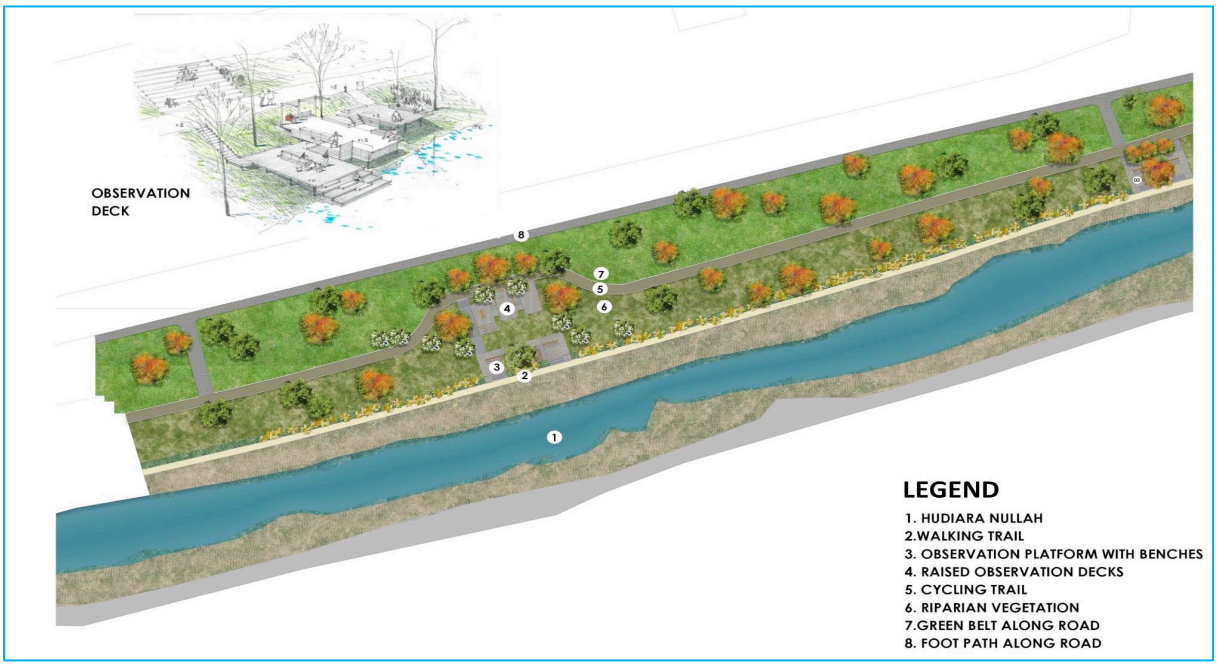


Figure 26: An Example of Hudiara Nullah Landscaping proposal

7.6. Combined Effluent Treatment Plant for Industrial Clusters of Gujranwala

Cost: 39.675 PKR Million

7.6.1. Scope:

1. Successful implementation of the Proposed WWTPs Project will lead to improved water quality in the Gujranwala city, improved ecological health and reduced public health risk. Moreover, this effort will also enhance the recreational cultural value of the area adding onto the direct benefit of communities.
2. The city of Gujranwala has several commercial and industrial centers allowing the manufacturing of ceramics, iron safes, metal utensils, textiles, steel, sanitary and tannery production. Therefore, the CETP should be selected according to the type of effluent discharge. However, a generic representation of CETP is shown below:
3. It should also be mentioned here that before construction of CETP, apart from Treatment options and the effluent discharge several factors need to be taken into consideration such as:
    - Should be located at a lower elevation in comparison to target area to permit gravity flow
    - Should be fairly isolated from developed areas
    - Flood zones should be avoided unless appropriate flood protection is provided (levees, dikes etc.)
    - Year round/Easy road access for material transport. Preexisting road access is ideal.
    - Clear of Historical and Ecologically sensitive regions.
    - Availability of water bodies or flow streams capable of accepting plant effluent.
    - Situated near the zones to be served – allows economic regrouping of water sewers etc.
4. Studies show that the Electroplating industrial sector as present in Gujranwala discharges effluent with heavy metals like chromium and nickel. So BEST Available Technologies (BAT) insists on recovering the metals and recycling the water. Therefore, the best suited technologies for this purpose would be Reverse Osmosis (RO), Ion-exchange, and Electrodialysis and evaporation, etc. as these are more effective in terms of efficiency and applicability.

Key Challenges

Key Challenges

The regional planning exercise helped to identify a number of challenges exist across the Gujranwala region in relation to WSS service delivery. Some of the key challenges are;

- The underground water supply distribution network has expired its life in most of the areas of Zone-II, followed by Zone I and then Zone III
- Low budget allocation for extension of existing water supply schemes and construction of new water supply schemes
- Technical, financial and human resources capacity constraints
- Institutional framework related to water governance is weak and poorly managed i.e., un-clarity about roles and functions of departments
- There is unclear jurisdiction of service areas which results in overlapping of their functions and leave a lot of areas un-served
- Absence of institutional mechanism to generate reliable data on time series and geographical basis The water shortage and increasing competition for multiple uses of water adversely affects the quality of water
- Resource allocation is not based on need assessment, criteria and data
- There is no communication strategy/plan and capacity building/plan available in WASAs and other entities.

The Strength, Weaknesses, Opportunities and Threats (SWOT) analysis of WASA-G is exhibited below:

STRENGTHS

Legal basis for charging all consumers for water

Existing studies on household incomes and willingness to pay for water and sewerage

Potential of revenue from industries

Potential revenue from aquifer charges

OPPORTUNITIES

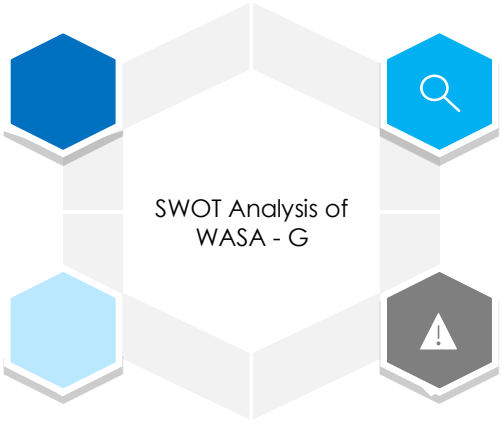
Willingness to pay by consumers

Revenue from illegal customers

Outsourcing for energy efficiency and operation & maintenance

Capture Opportunities

Training Opportunities



WEAKNESSES

Well - defined tariff structure not in place

Lack of Human Resource

High NRW Limited revenue / arrears collection

High electricity costs and dependency of services on electricity

Rapidly increasing expenditure

THREATS

Limited government subsidy

High operation & maintenance, salaries and electricity costs No regulation of water extraction

Disposal of Industrial wastewater in to municipal sewers

Figure 27: SWOT analysis of WASA - G

Annexures

Annex – A: List of tubewells of WASA G

Sr.#	Tube Well Location	Capacity
Zone-I		
1.	Madina Colony, Jinnah Road	4 Cusec
2.	Bhecopura	2 Cusec
3.	Hamilton Road	2 Cusec
4.	Commissioner Office	2 Cusec
5.	Khokharki	2 Cusec
6.	Session Court, Sialkot Road	2 Cusec
7.	Camp No.4 Civil Line	2 Cusec
8.	Saleem colony	2 Cusec
9.	Liaqat Bagh (Park)	4 Cusec
10.	Liaqat Bagh	4 Cusec
11.	Liaqat Bagh (Office)	2 Cusec
12.	Zero Point Pasroor Road	2 Cusec
13.	Satellite Town B-Block	2 Cusec
14.	Satellite Town B-Block (Tanki)	2 Cusec
15.	Wahdat Colony	4 Cusec
16.	Dera Jamshed	2 Cusec
17.	Chaman Shah (CIA)	2 Cusec
18.	Chaman Shah (Park)	2 Cusec
19.	WASA Residence Haidery Road	2 Cusec
20.	Peoples Colony (W-Block)	2 Cusec
21.	Haidery Road	2 Cusec
22.	Peoples Colony (X-Block)	2 Cusec
23.	Behari Colony	2 Cusec
24.	Nigar Phatak	2 Cusec
Zone-II		
25.	Dawood Wala Khu	2 Cusec
26.	Muhammadi Town	2 Cusec
27.	Madina Colony Khiali	2 Cusec
28.	Tower Road Khiali	2 Cusec
29.	Main Bazar Sarfraz Colony	2 Cusec
30.	Khiali OHR	2 Cusec
31.	Jinnah Park G.T Road	2 Cusec
32.	Nowshera Road D/Station	2 Cusec
33.	Bahtha Colony Nowshera Sansi	2 Cusec
34.	Sialvi Town	4 Cusec
35.	Jinnah Road	4 Cusec

36.	Nowshera Road OHR	4 Cusec
37.	Saghir Park, Nowshera Road	2 Cusec
38.	Nowshera Road OHR	2 Cusec
39.	Khalifa Aslam Park 1	2 Cusec
40.	Khalifa Aslam Park 2	2 Cusec
41.	Prao Chowk	2 Cusec
42.	Sheranwala Bagh Ladies Park 1	2 Cusec
43.	Sheranwala Bagh Ladies Park 2	2 Cusec
44.	Sheranwala Bagh (Wrestling)	2 Cusec
45.	Sheranwala Bagh WAPDA office	2 Cusec
46.	Nian Chowk	2 Cusec
Zone-III		
47.	Camp No. 2 Gurunanak Pura	2 Cusec
48.	Jannat Bibi Park	2 Cusec
49.	Islamia College	2 Cusec
50.	Garjakh Graveyard	2 Cusec
51.	Rehman Pura	2 Cusec
52.	Eid Gah Qaddafi Road	2 Cusec
53.	Hameed Pura Rasheed Colony	2 Cusec
54.	Rose Garden Hall Hafizabad Road	2 Cusec
55.	PHED Model Town	2 Cusec
56.	WASA office Model Town	4 Cusec
57.	Comprehensive school Model Town	2 Cusec
58.	A-Block Model Town OHR	2 Cusec
59.	Central Park Model Town	4 Cusec
60.	Gondlanwala Road	2 Cusec
61.	Small Estate, Model Town	2 Cusec
62.	Govt. High school Dhullay	4 Cusec
63.	Gulshan Iqbal Park	4 Cusec
64.	Pasban Colony	2 Cusec
65.	Afzal Pura, Jannat Town	2 Cusec
66.	Munji Ground	2 Cusec
67.	Dhullay Chowk	2 Cusec