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من الشعب الأمريكي

**Governance Strengthening Project
(GSP)**

Diwaniyah Sewer

Service Delivery Improvement Plan (SDIP)

Prepared by

Diwaniyah Sewer Directorate

In cooperation with

GSP/Taqadum

February 2015

Diwaniyah - Iraq

2-Executive Summary

The current analysis mechanisms used in reviewing performance indicators of Al-Diwaniyah Sewer Directorate in providing services, compared with national standards, to ensure quality and sustainable services and timely response to citizen complaints and requests, have resulted in a set of basic elements and a set of immediate and long-term solutions that will improve service delivery to citizens, as follows:

Management of Sewer Services: Management of water service delivery is an important and effective element in promoting healthy society by ensuring suitable environment which reflects positively on the growth of the economy and health of society. On the other hand, lack or bad services would affect negatively on the society public health. Service management is based on vital elements which should be effectively and efficiently invested to provide integrated services with high quality to citizens.

Other important elements are financial resources (investment and operational budget, effective usage of revenues from collecting fees or charges), human resources (the administration of the directorate, engineering staff, and those who work in lifting stations and treatment compounds) and other available resources such as Supplies and vehicles. Financial resources are not the only element that governs and directs the delivery of services; rather, the management of these resources through organized processes and preplanning and investment are also important. All these would achieve the goals of the Directorate and local government, as well as the national strategic goals.

It is worth noting that financial integration of the Directorate with other service sectors and the integration in preparing the operational budget in consistent with the investment budget have a positive effect on the efficiency and sustainability of services.

3- Challenges and problems facing Al-Diwaniyah Directorate of Sewer; and significantly contributing in providing poor quality of services to citizens

Classification by sectors (1- Financial- 2-Human resources -3- Authorities

➤ Financial

1. The total annual amount of the monthly grant of the budget (from the Ministry/ Directorate general of sewers) for 2013 is **5,200,000,000**, Five billion and two hundred million Iraqi dinars. The directorate annual revenues are amounting to **594,591,749** Iraqi dinars, thus the total annual amount is **5,794,591,749** Iraqi dinars. For 2014, the total annual amount of the monthly grant is amounting to 4,914,891,520 Iraqi dinars.

The annual revenues are amounting to **650,460,465** Iraqi dinar, consequently, the grand total of the grant and the revenues are amounting to **5,565,351,985** Iraqi dinar, to the following expending items. Accordingly, the decrease amount for 2014 is about 229,239,764 Iraqi dinar.

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- 1- Supplies and vehicles maintenance.
- 2- Fixed assets.
- 3- Maintenance of Buildings, sewer lines, and lifting stations.
- 4- Daily wages employees
- 5- Awards
- 6- Fuel
- 7- Overtime
- 8- Lease of buildings.
- 9- Spare parts ,stationeries and other requirements
- 10- Prints, publications, delegations, communications, and cleanings.
- 11- Expenditures of allocations of facilities protection.

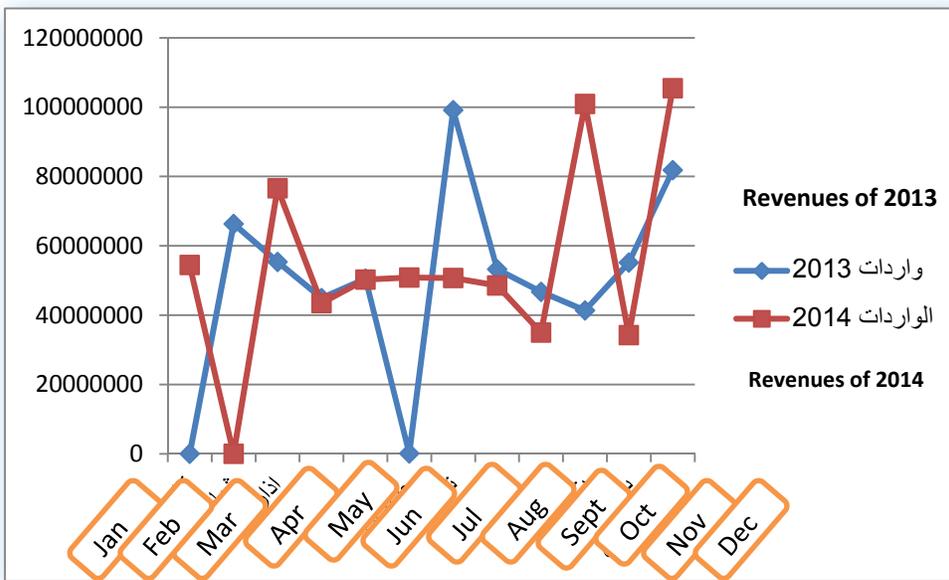


Figure 1-1: Revenues of 2013-2014

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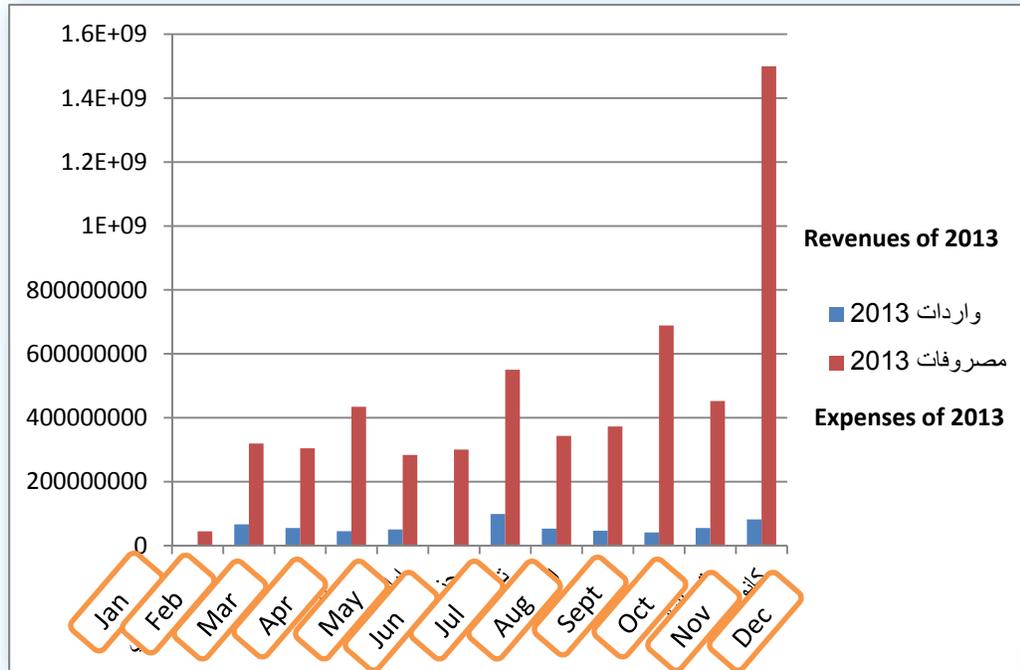


Figure 1-2: revenues and expenses of 2013

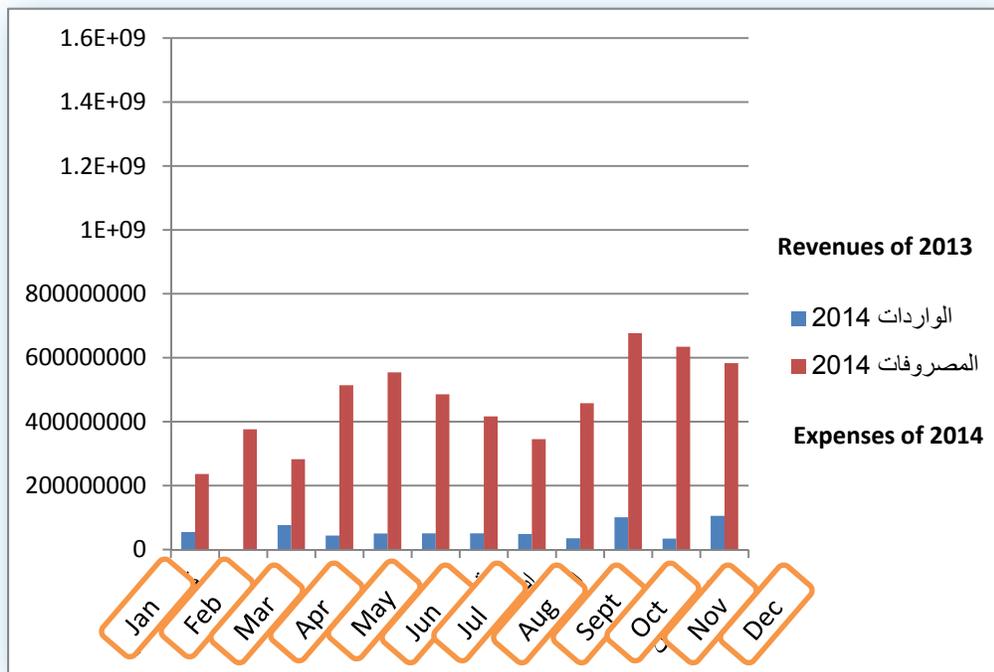


Figure 1-3: revenues and expenses of 2014

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➤ Infrastructure

- Large number of fractures in networks, with destruction of some of the aging networks in the following areas :-

- 1- Al-Diwaniyah City center, sanitary waste water network with a length of 236,539 Meter long.
- 2- Al-Diwaniyah City center, storm water network with a length of 87980 Meter long.
- 3- Al-Hamzah District center, storm water network with a length of 10750 Meter long
- 4- Efaq District Center, storm water network with a length of 2400 Meter long.
- 5- Al-Dagharah Sub-district, storm water network with a length of 1300 Meter long.
- 6- Al-Shannafiyah Sub-district, storm water network with a length of 1240 Meter long.

There are 18 unfinished projects from 2006 up to now.

S. No	Project name	Starting date	Financial completion rate	Completion rate		Notes
				Actual	Planned	
1-	Supply and install two screw pumps	02/01/2006	16%	50%	100%	Upon the official letter No. 2967 dated on 23/05/2013, issued by Al-Diwaniyah Province / Dept. of contracts/ committee of sewer, to withdraw the work and the concerned committee shall withdraw the work upon our decree.
2-	Develop designs to expand and establish Al-Diwaniyah Sewer treatment unit	08/04/2007	74%	81%	100%	Final notice to withdraw the work upon the official letter of Dept. of Contracts No. 2308 dated on 26/09/2010. A letter was sent to suspend the procedures of work withdrawal against the company upon the letter of Dept., of contracts No. 4819 dated on 04/09/2014.
3-	Execute a sewer network in Al-Ansar Quarter /1	17/02/2008	-----	85%	100%	Upon the official letter No. 3499 dated on 11/06/2012 issued by our directorate, A notice was sent to the company stating that it is necessary to resume the work

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						and complete the unfinished items.
4-	Execute, install, operate, and maintain a treatment unit in Al-Shamiyah district.	/09/2009	80%	97%	100%	Concerning the unexecuted items due to insufficient electrical and mechanical Supplies which were awarded to Qado Contracting company, which in turns, supplied all equipment, they were stored and then were taken by Al-Hanan Contracting company. Al-Hanan Company officially resumed the work to complete installation of the unit on 24/07/2013, providing that installation works shall be completed within four months according to the minute of the meeting held in the presence of the Minister on 24/07/2013. It is worth noting that in its official letter No. 1993 dated on 23/07/2013, Al-Hanan contracting company has pointed out that the period mentioned in the above minute does not include works included in the change order No. 3
5-	Develop studies and designs of sewer and storm water stations and networks in Al-Bdair Sub-district	11/06/2006		100 %	100%	Upon the official letter of Dept. of government contracts No. 3340 dated on 09/06/2014, further to the margin of Dept. of planning and projects management dated on 04/06/2014, and due to delay in work, it was decided to set a committee to withdraw the work.

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6-	Develop studies and designs of sewer and storm water stations and networks in Al-Diwaniyah district.	20/08/2006		60%	100%	Upon the administrative decree No. 715 dated on 10/02/2013 issued by Al-Diwaniyah province, a committee was set to study the real status of these contracting.
7-	Develop studies and designs of sewer and storm water stations and networks in Al-Shamiyah	20/08/2006		65%	100%	Upon the administrative decree No. 715 dated on 10/02/2013 issued by Al-Diwaniyah province, a committee was set to study the real status of these contracting
8-	Develop studies and designs of sewer and storm water stations and networks in Efaq.	20/08/2006		65%	100%	Upon the administrative decree No. 715 dated on 10/02/2013 issued by Al-Diwaniyah province, a committee was set to study the real status of these contracting
9 -	Execute the mainlines of wastewater of sewer networks and stations – Part one- from Al-Furat quarter to Al-Sader quarter.	22/07/2007		94%	100%	Our official letter No. 8400 dated on 11/11/2014 was sent to Al-Diwaniyah province / Dept. of planning and projects management / Sewer committee to approach an engineering consultative office to develop integrated designs and layouts for treatment, with an approved and priced bill of quantities of the contracting works, on 26/ /2007.
10-	Develop studies and designs of sewer and storm water stations and networks in Al-Shannafiyah	04/06/2007		60%	100%	Upon the official letter No. 3340 dated on 09/06/2014 issued by Dept. of government contracts, further to the margin of Dept. of planning and projects management dated on 04/06/2014, and due to delay in work, it was decided to set a committee to withdraw the work.

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11-	Develop studies and designs of storm water stations and networks in Al-Dagharah	04/06/2007		65%	100%	Upon the administrative decree No. 715 dated on 10/02/2013 issued by Al-Diwaniyah province, a committee was set to study the real status of these contracting
12-	Develop studies and designs of storm water stations and networks in Ghammas	20/06/2007		60%	100%	Upon the official letter No. 3340 dated on 09/06/2014 issued by Dept. of government contracts, further to the margin of Dept. of planning and projects management dated on 04/06/2014, and due to delay in work, it was decided to set a committee to withdraw the work.
13-	Execute the conveying line of sewer network from St. No. 30 to the final lifting station / Part 3	01/10/2007		97%	100%	Our official letter No. 4598 dated on 18/06/2014 was sent to Al-Diwaniyah province / Dept. of planning and projects management / Sewer committee to name a representative to complete the procedures of the initial handover of the contracting.
14-	Establish the final lifting station	22/07/2007		93%	100%	Our official letter No. 3414 dated on 06/05/2014 was sent to Al-Diwaniyah Directorate of electrical Power distribution concerning changing the conveyance line route in the station to enable the operation.
15-	Establish the main lifting station No. 1	22/07/2007		100 %	100%	Upon the official letter No. 5705 dated on 03/10/2013 issued by Al-Diwaniyah province / Dept. of planning and projects management / Sewer committee, which is addressed to the committee set up according to the administrative decree No. 4674 dated on 27/08/2013 stating that it is needed to

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						complete the procedures of the initial handover as soon as possible.
16-	Execute the conveying lines of sewer network from Al-Kawam Area through Al-Dhubbat Quarter to the express way.	22/07/2007		98%	100%	Receive the initial handover of the project according to the official letter No. 685 dated on 14/10/2014 issued by the office of consultative and scientific services / College of Engineering/ Al-Muthana University.
17-	Verify studies and designs for (Al-Diwaniyah, Efaq, Al-Shamiyah, Al-Hamzah, Ghammas, Al-Dagharah, Al-Shannafiyah, and Al-Bdair)	30/12/2009		90%	100%	A response was made to the request of the consultative office to terminate the contract and pay off the dues by the Al-Qadisiyah province / Dept. of Contracts In its official letter No. 168 dated on 11/01/2011
18-	Expand the project of wastewater treatment in Al-Diwaniyah on 06/05/ 2007	08/04/2007		93%	100%	Upon the official letter of the dept. of the resident engineer No. 531 dated on 26/02/2014 which is addressed to Al-Diwaniyah province / Dept. of planning and projects management to submit its opinion on the meeting held on 10/02/2014 between the dept. of the resident engineer and Al-Takaful Company to find solutions related to the project.

➤ **Quality control**

- There is of the quality control division in the directorate, except the laboratories section which monitors the quality of water coming out of the treatment stations.
- Evaluate the performance on a regular basis through the citizens' complaints and improve the service based on that.

➤ **Maintenance and Operation :**

- There is no a preventive maintenance program and the absence of trainers for such programs in all sewer and storm water networks and stations. Moreover, most of the used maintenance actions are corrective ones, and it is necessary to adopt a work plan for preventive and periodic maintenance for all networks, lifting stations, and treatment stations.
 - The number of storm water stations in Al-Diwaniyah is (28) and (3) stations for drains working with submersible pumps with a capacity of (200-1100 M3/h), as well as a storm water sewer network with a length of 67,538 Km for Al-Diwaniyah district center only.
 - In the province, there is one station for heavy water treatment in place with a capacity of (12,000 M3/day). This project is designed to serve 50,000 people. However, the amount of the inflow water is 35,000 M3/day which exceeds the specified amount. The project is in need for rehabilitation and maintenance for the second stage (maintenance for the mechanical and electrical works, cleanings and revamp civil works). Currently, the heavy water is discharged into the river (and after completing the drain which is completed by 70%, heavy water will be discharged into that drain, and then to Al-Diwaniyah river after treating heavy water.
- **The most significant problems faced by the central treatment unit in Al-Diwaniyah:**
- Because of the Illegal use of storm water networks, the directorate of sewer was obliged to connect the lifting stations of those networks with the treatment units, causing a burden on the treatment unit.
 - In the province, there is one station for heavy water treatment in place with a capacity of (12,000 M3/day). This project is designed to serve 50,000 person, and it in need for (maintenance of mechanical and electrical works, cleanings, and revamp civil works, whereas the project was established more than 20 years ago.

4. Stages of work on the service delivery improvement plan:

Al-Diwaniyah Sewer Directorate and in cooperation with USAID GSP/Taqadum program completed the gap analysis model developed by Taqadum program to actively contribute to the gap analysis. The importance of gap analysis in the services provided to citizens is that:

1. The use of the scientific method in the analysis of all elements that causes a gap in the services provided to citizens indicator compared with the standard criteria.
2. Determine the priority of the elements influencing the gap in services through the power of their influence.
3. Put the proposed immediate and long-term solutions to address the elements affecting the gap in order to minimize it.
4. The results of the analysis which represent proposed immediate and long-term solutions will be the input for the preparation of relevant service delivery improvement plan in the province.

Al-Diwaniyah Sewer Directorate has relied on the use of measurements rates that have been collected in the 15 administrative units (as in annexes 2 and 3) to serve sewer and storm water with a focus on the most vulnerable units in order to develop effective solutions to reduce the gap and improve the services provided to citizens through the immediate and long-term

solutions. The successful use of the model will lead to get accurate results that help determining the right and realistic and executable solutions in reducing the gap and improving the service.

Analysis of elements causing the gap in the service performance:

It Included analysis of (14) elements that are associated with one of the service Standards listed previously and relating to the administrative, legal, financial, technical aspects where after completing the analysis, weaknesses or deficiencies were identified in each element and the proportion of its influence in the gap, and thus the most influential elements in the events of the gap were chosen. Al-Diwaniyah sewer directorate identified these elements and developed immediate and long-term solutions that effectively contribute to the reduction of the value of the gap. In the next chapter, all performance indicators will be analyzed in comparison with Standards via using elements analysis in detail, and finally to develop solutions for the elements of the most influential events in the gap. Annex No. 1 includes a guide to use gap analysis of the services provided to citizens which was applicable by Al-Diwaniyah Directorate of Sewer

5. Gradual approach

The (SDIP) includes the following questions:

1. Where are we now?
2. Where do we want to be?
3. How can we get there?
4. How can we ensure success?

"1-5 "Where are we now?"

To answer this question, it requires a comprehensive and objective review and a review of the current state of performance and practices of sewer departments in Al-Diwaniyah and should be measured through key performance indicators. The data related to 'Where are we now?' "Can be obtained by using the relevant technologies,

First: ((SWOT analysis by diagnosing strengths -weakness, -opportunities-threats.

Second: Key Performance indicators analysis - these two techniques help to understand and summarize the environment and the performance of the Directorate.

The SWOT analysis helps to identify realistic short, medium and long-term goals in order to:

- Correct weaknesses
- Enhance strengths
- Prevent threats
- Seize opportunities

- Achieve vision

First: SWOT Analysis of Al-Diwaniyah directorate of sewer:

Strengths

1. There are efficient technical and engineering staff to carry out the projects;
2. The desire of the central government to provide financial support and increase allocations for such projects.
3. The existence of IT and GIS departments, support of the Ministry, and the desire of the central government to make use of modern technologies.

Weaknesses

1. The lack of financial allocations to the maintenance of sewer and storm water stations and networks.
2. The lack of vehicles such as sewer vacuum trucks and heavy water trucks.
3. Aging of sewer networks.
4. Lack of staff which doesn't suit many tasks undertaken by the Directorate
5. Frequent illegal usages on storm water networks and the lack of health awareness by citizens
6. The lack of financial allocations specified for the projects of sewer sector.
7. The Directorate lacks to the headquarters of maintenance centers in the district and sub-districts
8. The lack of sewer fees resulting in low revenues compared with the amount of the service.
9. Lack of new legislation to replace old one to address the new problems.

Threats:

- 1- The lack of specialized vehicles (sewer vacuum truck, septic truck, and sewer suction truck) which are used in networks maintenance works.
- 2- The lack of financial budget specified for the directorate compared with delivered services level, and the high cost of maintenance required to fix vehicles, stations and treatment units.
- 3- There are some problems in the aging networks in the districts and some sub-districts as well as the illegal uses by citizens as a result of the lack of their health awareness.
- 4- Delay of local companies in implementing projects. In addition, such projects are not designed in such a way to link all neighboring areas, leaving some residential and industrial areas without a sewer network.
- 5- Lack of experience of some companies and advisory offices in preparing modern designs of sewer networks and treatment units; and
- 6- The acquisition of land on which a project is established is a slow process.

Opportunities

- 1- The provincial legislative council is elected;
- 2- Sewer sector is considered a priority;
- 3- The possibility of involving technicians and engineers with foreign companies to gain international experience;
- 4- There are in place engineering advisory offices which can provide required consultations, such as the universities of Diwaniyah, Kufa, and Nahrain;
- 5- The Iraqi Investment Law is in force, and there is a potential to increase internal revenues by making use of wastes resulting from the treatment process; and
- 6- The activation of the e-government is supported by the local government.

Second: performance indicators:

GSP/Taqadam Project supports local governments in improvement of service delivery oversight and supervision in order to advance level of services provided to citizens through adopting measurable standards in a manner that is similar to other developed countries. The service delivery standards rely on five major basics in sewer disposal and three standards in rainwater discharge service since it is regarded as key service that need to be obtained in quantitative and qualitative manner through the following standards and indicators:

- 1- Coverage of the service
- 2- The efficiency of the service
- 3- Ability for treatment
- 4- Effectiveness of waste water treatment
- 5- Addressing people complaints in an effective manner.

Service delivery standards are also stand on three major indicators in (storm water) sewer service which are:

- 1- Coverage of the service
- 2- The efficiency of the service
- 3- Addressing people complaints in an effective manner.

Al-Diwaniyah Directorate of Sewerage acted according to these indicators. All indicators at provincial, district and sub-district levels were provided. The directorate reviewed performance indicators in comparison with standards, diagnosed weaknesses, identified value of gap and made recommendations that contribute to advancement of level of services provided throughout the province.

➤ **Sewer service**

Wastewater treatment is performed in three stages:-

First stage: - physical treatment which includes disposing of wastes, various kinds of impurities, and sand.

Second stage:- it includes the biological treatment of wastewater, where atmospheric oxygen is dissolved in the sewer to activate aerobes which in turn have an effective role

to make wastewater separable water (water and manure), and it also includes the settling tank in which clean water is separated from sludge.

Third stage: - it is the third treatment of sewer, and it is more effective than traditional biological treatment to reach the permissible values of concentrations of the external pollutants with the treated water.

The number of specialized vehicles in service:

The numbers of the specialized vehicles in Al-Diwaniyah district center are:-

- 1- 27 Sewer vacuum trucks
- 2- 44 Septic tankers
- 3- 5 suction trucks
- 4- 8 excavators
- 5- 2 cranes

Please, see annex No. 4, for more information about the numbers of vehicles of the directorate in all the districts and sub-districts of the province.

➤ **Coverage indicator:**

It represents the extent of coverage of sewer networks for all residential units and other facilities in the area of service. It is the percentage between the total number of residential units and facilities which have a direct linkage to the service, divided by the total number of all residential units and other facilities in the area of service. The service coverage indicator for Al-Diwaniyah center is 30%.

Coverage = [(b/a) 100]

a: the total number of all residential units and other facilities in the area of service

b: the total number of the residential units and facilities which have a direct linkage to the service.

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
1	Service coverage	30%	70%

Elements causing gap and their effect:

- 1) **Human resources:** there is an integrated sewer project (which is under construction) in Al-Diwaniyah district center. This project includes 8 sewer lifting stations and a wastewater treatment station with a capacity of 100,000 M3/day; it also contains

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- wastewater network with length of 360,000 Meter long, 17 stations for lifting and discharging storm water, and a storm water network with a length of 160,000 Meter long. This element has a low effect on the gap.
- 2) Financial Issues:** fund allocated to the operational budget is 350,000,000 Iraqi dinar per month, and it is specified for fuel, maintenance and daily wages employees. It is not enough to meet the needs when completing Al-Diwaniyah big sewer project which totally minimizes the gap as it enters into service. Therefore, the directorate is in need for about twice the current budget. This element has a high effect on the gap.
 - 3) Infrastructure:** there is an integrated sewer project (under construction). This project includes 8 sewer lifting stations and a wastewater treatment station with a capacity of 100,000 M3/day, as well as wastewater network.
 - 4) Supplies:** It has no direct effect upon the gap.
 - 5) Capacity building :** It has no direct effect upon the gap
 - 6) Technical obstacles:** It has no direct effect upon the gap
 - 7) Authorities:** There is no financial authority to buy specialized vehicles, implement alternative or additional networks, and always obtain the approvals from the directorate general which negatively affects the provision of service delivered to citizens.
 - 8) Coordination:** poor coordination with the concerned departments (water, electricity, communication, Antiquities, environment, urban planning, municipality, oil lines, etc....) to expand additional networks to improve the coverage of the service. The effect of this element is high on the gap.
 - 9) Political interventions:** It has no direct effect upon the gap.
 - 10) Misuse of resources :** It has no direct effect upon the gap
 - 11)Maintenance and Operation:** It has no direct effect upon the gap
 - 12)Security conditions:** It has no direct effect upon the gap as the province is secured and stable.
 - 13)Logistic support:** It has no direct effect upon the gap.

Based on the above explanation, the following elements have the highest effect on the gap: 1) Financial resources (2) Authorities (3) Coordination.

S.No	Standard	Arrangement of basic elements (which receives the figure 3 (high effect) that contribute to the reduction of the value of the gap, according to the priority	Immediate solutions	Long term solutions

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1	Service coverage	Coordination	Coordinate with the G.O to direct the government departments to give approvals for the projects of expanding networks as a result of a delay in obtaining the approvals. .	Draft laws and develop local programs to eliminate routine between the departments from one side and the province and the Ministry from another side.
		Financial issues	N/A	Allocate funds to increase the monthly operational budget from the Ministry.
		Authorities		Draft local and national laws to increase the authorities of the sewer directorate (financial, technical, administrative, and legal)

➤ **Efficiency of service:**

This indicator gives the percentage of the amount of discharged water within the network compared to the amount wastewater discharged in the area of service. The amount of water discharged to sewers is related to the amount of produced drinking water as a monthly average.

$$\text{Efficiency of service} = \left[\frac{b}{a} \times 0.75 \right] * 100$$

A: the total amount of drinking water produced during the month.

B: the amount of wastewater in the network.

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
2	Service coverage	85%	15%

Elements causing gap and their effect:

- 1) Human resources:** there is a need for 20 workers to clean the networks and 20 workers to maintain the lifting stations. The existing number of workers is 20

- operators for the networks and 6 workers for maintaining the lifting stations. The effect of this element is high on the gap.
- 2) **Financial Issues:** the existing network, lifting stations, and treatment stations are in need for periodic maintenance. The operational budget is insufficient to meet the need, and therefore it needs an additional amount amounting to 100,000,000,000 Iraqi Dinar per month. This element has a high effect on the gap.
 - 3) **Infrastructure:** as a result of the damage and overloaded sewer lines, and disability to be replaced or need potentials and funds beyond the authorities of the directorate. The effect of this element is high on the gap.
 - 4) **Equipment:** the lack of the specialized vehicles (septic tankers and sewer vacuum trucks) in the directorate resulting in the gap. The directorate needs 5 septic tankers and 5 sewer vacuum trucks to minimize the gap. The effect of this element is high on the gap.
 - 5) **Capacity building:** the sewer directorate of Al-Diwaniyah needs 4 qualified trainers, training curriculum for maintenance and operation, and a classroom. It has a high effect upon the gap.
 - 6) **Technical obstacles:** lifting pumps failure, aging networks and conveyance lines, and generators failure are considered technical outages linked to the gap. It has a high effect upon the gap.
 - 7) **Authorities:** It has no direct effect upon the gap.
 - 8) **Coordination:** It has no direct effect upon the gap.
 - 9) **Political interventions :** : N/A
 - 10) **Misuse of resources:** illegal uses to sewer networks by citizens lead to blockages in the networks and inability to discharge wastewater. Therefore, controlling these illegal uses will minimize the gap. This element has a high effect upon the gap.
 - 11) **Maintenance and Operation:** networks maintenance needs cleaning workers and lifting stations need maintenance workers as well as specialized vehicles (septic tankers, sewer vacuum trucks, and sewer suction trucks). It also needs a preventive and regular maintenance programs. This element has a high effect upon the gap.
 - 12) **Security conditions:** It has no direct effect upon the gap as the province is secured and stable.
 - 13) **Logistic support:** It has no direct effect upon the gap.

Based on the above explanation, the following elements have the highest effect on the gap: 1) Financial resources 2) Infra structure 3) Supplies 4) Technical obstacles 5) Capacity building 6) Misuse of resources 7) Maintenance and Operation 8) Human resources

S.No	Standard	Arrangement of basic elements (which receives the figure 3 (high effect) that contribute to the reduction of the value of the gap, according to the priority	Immediate solutions	Long term solutions

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2	Service coverage	Misuse of resources	Develop awareness programs by the directorate in cooperation with local government and departments of health , environment and media (at least two Campaigns)	Activate the laws (the general authority law of water and sewer No. 27 of 1999) against violators who throw cars oil and wastes of hospitals, governmental and private labs and factories in rivers and sewer lines.
		Maintenance and operation	Conduct maintenance with available materials , Supplies and vehicles Activate persistent and periodic maintenance. Clean and maintain networks continuously to ensure the network efficiency. Set a committee to prepare a preventive maintenance schedule (electrical + civil + mechanical) for networks and stations	Develop a maintenance and operation program according to international standards Follow-up the execution of preventive maintenance by the follow up unit in the sewer directorate in Al-Diwaniyah.
		Human resources	Appoint the temporary contracts and daily wages employees. The existing staff consists of the following : 46 engineers, 426 technicians, 80 administrative employees, 31 financial employees, 99 temporary contracts, 179 daily wages employees, and 4 service employees.	Create job prospects and allocate funds to these vacancies by the Ministry of Finance.
		Capacity building	Conclude contracts with trainers and	Create job prospects for these specialties and

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			develop maintenance and operation programs funded by the operational budget specified to the directorate.	conclude contracts with companies or trainers to provide programs of maintenance and operation.
		Supplies	N/A	Increase the funds and increase technical and financial authorities.
		Technical obstacles	Use the septic tankers and sewer vacuum trucks (specialized trucks), where the current numbers of vehicles are 44 septic tankers, 27 sewer vacuum trucks and 5 sewer suction trucks.	Develop a maintenance and operation program according to international standards
		Financial issues	N/A	Allocate funds to increase the operational budget from the Ministry.
		Infrastructure	Treat the blockages and fractures in the networks due to aging within the amounts of the operational budget.	Expand old lines in the network and treat the fractures which require funds beyond the directorate authority.

➤ **Ability for treatment:**

The design capacity of the treatment unit is 12000 M3/Day, its capacity is amounting to 20,000 M3/Day, and the average of the inflow amounts of water for the station is 40,000 M3/day, and accordingly, the ability for treatment is 50%. The ability of the secondary treatment for all wastewater resulting from water projects is calculated from the percentage of the actual capacity of wastewater treatment projects in proportion to the amount of water provided through the network for citizens (daily or monthly), taking into consideration the amount of water lost from the networks due to fractures.

$$\text{Ability for treatment} = [(b/a*0.75)]$$

a: the amount of water provided through the network for citizens (daily or monthly)

b: the actual capacity of wastewater treatment projects.

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
2	Ability for treatment	50%	50%

Elements causing gap and their effect:

- 1) **Human resources:** this element has no direct effect on the gap.
- 2) **Financial resources:** insufficient funds specified for treatment station maintenance, where there is no fixed allocation for treatment units. 20 million shall be allocated per month for minimizing the gap. It is worth noting that expansion in Al-Diwaniyah station is in progress. This element has a high effect on the gap.
- 3) **Infrastructure:** damages in settling vet or Aeration Tanks and inability to fix them using available materials and Supplies or need funds beyond the directorate authority reduced the station ability to treat and have capacity for inflow water or needs additional tanks to contain inflow water. This element has a high effect on the gap.
- 4) **Supplies:** It has no direct effect upon the gap.
- 5) **Capacity building :** It has no direct effect upon the gap
- 6) **Technical obstacles** lifting pumps failure, aging station tanks and generators failure are considered technical outages linked to the gap. It has a high effect upon the gap.
- 7) **Authorities: :** There is no financial and technical authorities to expand the station or fix part of the station in future, and always obtain the approvals from the directorate general which negatively resulting in the inability for treatment. This element has a high effect on the gap.
- 8) **Coordination:** It has no direct effect upon the gap.
- 9) **Political interventions :** It has no direct effect upon the gap.
- 10) **Misuse of resources:** water wastage by citizens leads to entering large amounts of water to the treatment station which exceeds its capacity and accordingly leads to inability for treatment. This element has a high effect upon the gap.
- 11) **Security conditions:** It has no direct effect upon the gap as the province is secured and stable.
- 12) **Logistic support:** It has no direct effect upon the gap.

Based on the above explanation, the following elements have the highest effect on the gap: 1) Financial resources 2) Infrastructure 3) Technical obstacles 4) Authorities 5) Misuse of resources 7) Maintenance and operation.

S.No	Standard	Arrangement of basic elements (which receives the figure 3 (high effect) that contribute to the	Immediate solutions	Long term solutions

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		reduction of the value of the gap, according to the priority		
3	Ability for treatment	Misuse of resources	Develop awareness programs by the directorate in cooperation with local government and departments of health , environment and media (at least two Campaigns)	Activate the laws (the general authority law of water and sewer No. 27 of 1999) against violators who throw cars oil and wastes of hospitals, governmental and private labs and factories in rivers and sewer lines.
		Maintenance and operation	Conduct maintenance with available materials, Supplies and vehicles.	Develop a maintenance and operation program according to international standards
		Technical obstacles		Develop a maintenance and operation program according to international standards Maintain new Supplies and machineries.
		Authorities		Vest more financial and technical authorities from the Ministry to the directorate.
		Financial issues		Allocate funds to increase the monthly operational budget from the Ministry.
		Infrastructure		Accelerate Completing the project of expanding Al-Diwaniyah sewer treatment station in Khairi area

➤ **Efficiency of wastewater treatment:**

Efficiency of wastewater treatment is measured through measuring the percentage of tested samples taken from secondary treatment outlet which exceeded the standard specifications.

$$\text{Efficiency of treatment} = [(b/a)*100]$$

a: total number of samples tested during the month.

b: total number of samples which passed the test and matched the standard specifications during the month.

The amount of inflow water is two times the capacity of the station, and this means that the station is unable to produce water according to Iraqi standards specifications because the inflow amount is more than the ability of bacteria to get rid of the pollutants. Quality of outflow water from the station to river shall not cause any environmental damages.

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
4	Efficiency of wastewater treatment	10%	90%

Elements causing gap and their effect:

- 1) **Human resources:** treatment unit needs 10 operators and 10 electrical and mechanical maintenance workers distributed on three shifts, because the insufficient numbers of workers affect the quality of samples taken by laboratory employees (when the sludge is not lifted for a certain period of time, this process will affect the quality of samples and accordingly affect the criterion of efficiency of treatment). The number of employees working in the lab is sufficient. This element has a high effect on the gap.
- 2) **Financial resources:** funds allocated for the maintenance of treatment station is insufficient, where there is no fixed allocation for treatment units. 20 million shall be allocated per month for minimizing the gap. It is worth noting that expansion in Al-Diwaniyah station is in progress. This element has a high effect on the gap.
- 3) **Infrastructure:** damages in settling vet or Aeration Tanks and inability to fix them using available materials and Supplies or need funds beyond the directorate authority reduced the station ability for treatment. This element has a high effect on the gap.
- 4) **Supplies:** lack of spare tools such as main pumps affects the efficiency of the treatment. If any part of the station stopped, there will be a failure in the treatment process. The station is in need for spare parts, cooling oil, and fuel. It has a high effect upon the gap.

- 5) **Capacity building:** Al-Diwaniyah sewer treatment station needs to build the capacities of the workers to improve the station operation process to ensure obtaining more samples that passed the test. This element has a high effect upon the gap.
- 6) **Technical obstacles:** damage of main pumps or any part of the station will lead to a failure in the treatment process, or aging settling vet, generators failure and ventilators failure in the Aeration Tanks lead to kill bacteria. All these failures are considered technical and have effects on results of the samples tests and accordingly on the indicator and the gap. This element has a high effect upon the gap.
- 7) **Authorities:** It has no direct effect upon the gap.
- 8) **Coordination:** It has no direct effect upon the gap.
- 9) **Political interventions :** It has no direct effect upon the gap.
- 10) **Misuse of resources:** illegal uses to sewer lines by people who gets ride of oil in the sewer lines and the station doesn't have an oil treatment unit which in turns affect the growth of aerobes in the aeration tanks in the treatment station and accordingly reduce the treatment efficiency. It is worth noting that there are sufficient Supplies and tools in the lab to make tests. This element has a high effect upon the gap.
- 11) **Maintenance and operation:** the station needs 6 maintenance workers, a preventive maintenance program, and an operation program. Any failure in equipment, pumps, and ventilators has effects on the samples taken to be tested. This element has a high effect on the gap.
- 12) **Security conditions:** It has no direct effect upon the gap as the province is secured and stable.
- 13) **Logistic support:** It has no direct effect upon the gap.

Based on the above explanation, the following elements have the highest effect on the gap: 1) Human resources 2) Financial resources 3) Infrastructure 4) Supplies 5) Technical obstacles 6) Capacity building 7) Misuse of resources 8) Maintenance and Operation

S.No	Standard	Arrangement of basic elements (which receives the figure 3 (high effect) that contribute to the reduction of the value of the gap, according to the priority	Immediate solutions	Long term solutions
4	Efficiency of wastewater treatment	Misuse of resources	Develop awareness programs by the directorate in cooperation with local government and departments of health , environment and media (at least two Campaigns)	Activate the laws (the general authority law of water and sewer No. 27 of 1999) against violators who throw cars oil and wastes of hospitals, governmental and private labs and factories in rivers and sewer lines.

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		Maintenance and operation	Conduct maintenance with available materials , Supplies and vehicles	Develop a maintenance and operation program according to international standards
		Capacity building	Conclude contracts with trainers and develop maintenance and operation programs funded by the operational budget specified to the directorate	Create job prospects for these specialties and conclude contracts with companies to provide programs of maintenance and operation.
		Technical obstacles	.	Develop a maintenance and operation program according to international standards
		Equipment		Increase the funds and increase technical and financial authorities
		Human resources	Appoint the temporary contracts and daily wages employees.	Create job prospects and allocate funds to these vacancies by the Ministry of Finance.
		Financial issues		Allocate funds to increase the monthly operational budget from the Ministry.
		Infrastructure	.	Accelerate Completing the project of expanding Al-Diwaniyah sewer treatment station in Khairi area.

Quick response to citizens' complaints:

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
5	Quick response to citizens' complaints	87%	13%

Elements causing gap and their effect:

- 1) **Human resources:** because the insufficient number of workers, the directorate needs additional 20 workers to clean the networks. This means that the number of complaints exceeds the number of the existing workers who respond to these complaints. The number of citizens' complaints has a direct effect on the criterion of quick response. The effect of this element is high on the gap.
- 2) **Financial resources:** the operational budget is insufficient to buy specialized vehicles to meet the needs and which accordingly affects the gap. The budget needs an increase amounting to a hundred million Iraqi dinar per month. This element has a high effect on the gap.
- 3) **Supplies:** lack of specialized vehicles (septic tankers and sewer vacuum trucks) in the directorate leads to create the gap. The directorate needs 5 septic tankers and 5 sewer vacuum trucks to minimize the gap. Noted that lack of vehicles was included as a provision project within the budget of 2012, but we have just received 11 vehicles in 2014. This element has a high effect upon the gap.
- 4) **Technical obstacles:** lifting pumps failure, aging networks and conveyance lines (about 30 years), and generators failure are considered technical outages linked to the gap. It has a high effect upon the gap.
- 5) **Financial Authorities:** There is no financial authorities to purchase specialized vehicles and implement new or alternative networks, and always obtain the approvals from the directorate general which negatively reduces the service delivery to citizens. This element has a high effect on the gap.
- 6) **Misuse of resources:** illegal uses to sewer networks by citizens lead to blockages in the networks and inability to discharge wastewater. Therefore, controlling these illegal uses will minimize the gap. This element has a high effect upon the gap.
- 7) **Maintenance and Operation:** networks need additional 50 cleaning workers (the existing number of workers is 20) and lifting stations need 20 maintenance workers as well (the number of existing workers is 15). This element has a high effect upon the gap.

Based on the above explanation, the following elements have the highest effect on the gap: 1) Human resources 2) Financial resources 3) Supplies 4) Technical obstacles 5) Authorities 6) Misuse of resources 7) Maintenance and Operation

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S.No	Standard	Arrangement of basic elements (which receives the figure 3 (high effect) that contribute to the reduction of the value of the gap, according to the priority	Immediate solutions	Long term solutions
5	Quick response to citizens' complaints	Misuse of resources	Develop awareness programs in cooperation with the local government	Activate the laws against violators
		Maintenance and operation	Conduct maintenance on the maintenance station with available materials , Supplies and vehicles	Develop a maintenance and operation program according to international standards
		Technical obstacles	. conduct periodic maintenance works to generators of the station (20 generators with capacities varied from 30-200 KV)	Develop a maintenance and operation program according to international standards
		Authorities		Vest more financial and technical authorities from the Ministry to the directorate.
		Equipment		Increase the funds and increase technical and financial authorities
		Human resources	Appoint the temporary contracts and daily wages employees.	Create job prospects and allocate funds to these vacancies by the Ministry of Finance.

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		Financial issues		Allocate funds to increase the monthly operational budget from the Ministry.
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➤ **Storm water discharge service**
Coverage of the service

The proportion of the streets provided with storm water networks within the area of the service out of total length of the streets.

$$\text{Coverage} = [(b/a)*100]$$

a: total number of main and sub-streets in the service area.

b: total lengths of main and sub-networks in the service area.

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
1	Service Coverage	39%	61%

Elements causing gap and their effect:

- 1) **Human resources:** there is an integrated sewer project (which is under construction). This project includes 17 storm water lifting stations and a storm water network and it will fully minimize the gap. Therefore, this project needs 10 engineers, 8 technicians, 50 operators, and 40 cleaning workers. This element has a low effect on the gap.
- 2) **Financial Issues:** fund allocated to the operational budget is 350,000,000 Iraqi dinar per month, and it is specified for fuel, maintenance and daily wages employees. It is not enough to meet the needs when completing Al-Diwaniyah big sewer project which totally minimizes the gap as it enters into service. Therefore, the directorate is in need for about twice the current budget. This element has a high effect on the gap.
- 3) **Infrastructure:** there is an integrated sewer project (which is under construction). This project includes 17 storm water lifting and discharge stations and a storm water network with a length of 160,000 Meter long. This element is not needed.
- 4) **Equipment:** It has no effect upon the gap.
- 5) **Capacity building :** It has no effect upon the gap
- 6) **Technical obstacles:** remaining old lifting stations is not a technical obstacle for the new one. There is a contradiction with services delivered by other departments such as water, electricity, and communication. The element has no direct effect on the gap.

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- 7) Financial Authorities:** There is no financial authority to purchase specialized vehicles and implement new or alternative networks, and always obtain the approvals from the directorate general which negatively reduces the service delivery to citizens. This element has a high effect on the gap.
- 8) Coordination: poor** coordination with the Governor office to allocate funds to maintain networks, lifting pumps, and treatment stations and purchase fuel for generators. Poor coordination leads to the station failure and therefore keeps the existence of the gap exists. The effect of this element is high on the gap.
- 9) Political interventions :** It has no effect upon the gap.
- 10) Misuse of resources :** It has no effect upon the gap
- 11)Maintenance and Operation:** It has no effect upon the gap
- 12)Security conditions:** It has no effect upon the gap as the province is secured and stable.
- 13)Logistic support:** It has no direct effect upon the gap.

Based on the above explanation, the following elements have the highest effect on the gap: 1) Financial resources 2) Authorities 3) Coordination

S.No	Standard	Arrangement of basic elements (which receives the figure 3 (high effect) that contribute to the reduction of the value of the gap, according to the priority	Immediate solutions	Long term solutions
1	Service coverage	Coordination	Coordinate with the G.O to direct the government departments to give approvals for the projects of expanding networks as a result of a delay in obtaining the approvals. .	Draft laws and develop local programs to eliminate routine between the departments from one side and the province and the Ministry from another side.
		Financial issues		Allocate funds to increase the monthly operational budget from the Ministry.
		Authorities		Vest more financial and technical authorities from the Ministry to the directorate.

➤ **Storm water discharge efficiency**

This indicator gives the percentage of amount of storm water discharged within the network in proportion to the amount of rainfall. The indicator of Storm water discharge efficiency is 80%.

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
1	Storm water discharge efficiency	80%	20%

Elements causing gap and their effect:

- 1) **Human resources:** it has no direct effect on the gap.
- 2) **Financial resources:** the existing network needs a periodic maintenance, but the operational budget is insufficient to meet the needs. Therefore, it needs an additional amount amounting to a hundred million Iraqi dinar per month. This element has a high effect on the gap.
- 3) **Infrastructure:** as a result of the damage and overloaded sewer lines, and disability to be replaced or need potentials and funds beyond the authorities of the directorate. The effect of this element is high on the gap.
- 4) **Equipment:** the lack of the specialized vehicles (septic tankers and sewer vacuum trucks) in the directorate resulting in the gap. There are 27 sewer vacuum trucks and 44 septic tankers, but the directorate needs an additional 5 septic tankers and 5 sewer vacuum trucks. The effect of this element is high on the gap.
- 5) **Capacity building:** the sewer directorate of Al-Diwaniyah needs 4 qualified trainers, training curriculum for maintenance and operation for the lifting stations and networks, and a classroom. It has a high effect upon the gap.
- 6) **Technical obstacles:** lifting pumps failure, aging networks and conveyance lines, and generators failure are considered technical outages linked to the gap. It has a high effect upon the gap.
- 7) **Authorities:** It has no direct effect upon the gap.
- 8) **Coordination:** It has no direct effect upon the gap.
- 9) **Political interventions :** : It has no direct effect upon the gap
- 10) **Misuse of resources:** illegal uses to sewer networks by citizens lead to blockages in the networks and inability to discharge wastewater. Therefore, controlling these illegal uses will minimize the gap. This element has a high effect upon the gap.
- 11) **Maintenance and Operation:** networks maintenance needs 50 cleaning workers and lifting stations need 20 maintenance workers. This element has a high effect upon the gap.
- 12) **Security conditions:** It has no direct effect upon the gap as the province is secured and stable.
- 13) **Logistic support:** It has no direct effect upon the gap.

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Based on the above explanation, the following elements have the highest effect on the gap: 1) Financial resources 2) Infrastructure 3) Supplies 4) Technical obstacles 5) Capacity building 6) Misuse of resources 7) Maintenance and Operation

S.No	Standard	Arrangement of basic elements (which receives the figure 3 (high effect) that contribute to the reduction of the value of the gap, according to the priority	Immediate solutions	Long term solutions
2	Efficiency of storm water discharge	Misuse of resources	Develop awareness programs by the directorate in cooperation with local government and departments of health , environment and media before rainy season (at least two Campaigns)	Activate the laws (the general authority law of water and sewer No. 27 of 1999) against violators
		Maintenance and operation	Conduct maintenance with available materials , Supplies and vehicles	Develop a maintenance and operation program according to international standards Evaluate the vehicles performance to realize their effectiveness and real deficit.
		Capacity building	Conclude contracts with trainers and develop maintenance and operation programs funded by the operational budget specified to the directorate	Create job prospects for these specialties and conclude contracts with companies to provide programs of maintenance and operation.
		Equipment		Increase the funds and increase technical and financial authorities

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		Technical obstacles	Using septic tankers	Develop a maintenance and operation program according to international standards
		Financial issues		Allocate funds to increase the monthly operational budget from the Ministry (the existing budget does not cover most of the expenses items for the directorate, it is worth noted that expenses items are mentioned in page 4 of this plan)
		Infrastructure		Accelerate Completing the project of expanding Al-Diwaniyah sewer treatment station in Khairi area. (two of the storm water stations were linked (Ramadhan quarter station with a capacity of 6000M3/day and Al-Salam quarter station with a capacity of 1500 M3/day) out of 28 stations due to large number of illegal uses by violators to the network)

➤ **Quick response to citizens' complaints:**

Standard and indicator information and calculation of gap between them			
S.No	Standard	Indicator	Gap
3	Quick response to citizens' complaints	80%	20%

Elements causing gap and their effect:

- They are the same element mentioned in the wastewater discharge service.

2 - 5 “where we want to be?”

Based on the information collected in as-in status report in 1.2.3, it is possible to develop and illustrate goals and objectives of the directorate that can be inferred from mission and vision of the directorate. It is obligatory to set performance standards and objectives according to SMART Standard (specific, measurable, assignable, realistic or time-related).

Vision of Al-Diwaniyah Sewer Directorate:

Improve all services of wastewater and storm water discharge networks which in turn considered the most important factor among other services.

Mission of Al-Diwaniyah Sewer Directorate:

Expand the delivery of sewer services at the province level to increase the percentage of the services in the sewer sector.

Objectives of Al-Diwaniyah Sewer Directorate:

1. Increase the percentage of delivery of wastewater disposal networks in the province center from 30% to 100% in one year, and from 10% to 90% in the districts and sub-districts during the next five years.
2. Identify the reality of sewer sector in the province, which needs five years to increase the percentage of delivery of wastewater disposal networks from 20% to 90% by 2020, and the challenges.
3. Identify the method of wastewater treatment and how to get use of the treated wastewater which needs five years be increased from 20% to 90%.
4. Expand the capacity of the treatment units to have capacity for discharged water and it needs five years to increase the percentage from 10% to 90%.
5. Control over water discharged to rivers according to standard specifications and it needs five years to be increased from 10% to 100%.

Strategy of development of sewer sector in Al-Diwaniyah province.

The strategy of Al-Diwaniyah sewer directorate to reach the goals is as follow:

- 1- Cover the rest of the districts and sub-districts with heavy water treatment complexes.
- 2- Establish conveyance lines in Al-Diwaniyah district center to serve the highly populated and unserved areas such as Al-Sader, Al-Furat, Al-Aruba, Al-Hakeem and Al-Jazaer quarters.
- 3- Develop new designs for wastewater and storm water networks for all districts and sub-districts.
- 4- Maintain the existing sewer networks which suffer from fractures and ill-considered additions and expansions.
- 5- Rehabilitate aging sewer networks by using modern technology to increase their capacity to suit the future population growth of Al-Diwaniyah province.
- 6- Impose fines against citizens and factories owners who violate the sewer disposal instructions and zero tolerance for citizens' interests.

3 - 5 “How can we reach there?”

Al-Diwaniyah Directorate of Sewerage in cooperation with USAID-funded GSP/Taqadum Project filled out gap analysis form as developed by GSP/Taqadum Project in order to contribute to gap analysis. The importance of the form for service delivery gap analysis comes from:

1. It uses scientific method to analyze all the effective elements which lead to a gap in service delivery indicator in comparison with standard.
2. It prioritizes the effective elements that lead to gap in service delivery by size of effect.
3. It proposes immediate and long term solutions to address the effective elements with the aim to reduce them.
4. Results of analysis, i.e. the proposed immediate and long-term solutions shall form inputs for preparation of service delivery improvement plan of the province.

The directorate relied on use of average measures collected in the 15 administrative units with concentration on the least effective units to set successful solutions with the aim to reduce the gap and improve service delivery to people through immediate and long term solutions. The successful usage of the form shall yield accurate results that help identify correct, realistic and achievable solutions to reduce the gap and improve the service.

4 – 5 “How can we ensure success?”

To ensure the success of SDIP, it is important to conduct continuous monitoring of progress assessment standards and indicators in order to improve the performance and external factors at all levels, and record findings and reactions using proper mechanisms for report writing to decision-makers including a detailed description of the problems and challenges, what is required, why and how, and create reliable database containing all required data provided that all data decided to be updated continuously, conduct field visits to identify citizens' opinions and using them as feedback, control the citizens' service desk in the directorate, coordinate with the citizens' service desk in the provincial council and the governor office, participate in the mass meetings to be close to citizens, develop plans according to actual needs supported by figures and tables to convince decision-makers and coordinate with the governorate office and other service departments. This allows the administration to identify factual and potential success and failure at early stage so that amendments are facilitated on time. It is required to establish a unit within the directorate to coordinate activities and assess the performance on a monthly basis in line with objectives approved. The unit shall report to DG of sewerage and prepare quarterly and annual progress and performance reports. DG of sewerage monitors the implementation of SDIP and reports to the Provincial Planning and Development Council and the Governor's Office as needed. All parties shall provide strategic guidance for effective implementation of the plan.

5. Suggestions proposed by GSP/Taqadum for immediate solutions:

- The government should always address the issue of getting access to water and sewer treatment services to cover all citizens;
- Current sewer networks are in need to regular and specialized maintenance to make the utmost use of the network;
- Develop awareness programs to protect sewer and storm water networks from dirt, oils and acids. Awareness campaigns should start from schools.

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- Financial allocations from the investment budget should be increased for the sewer sector to implement huge projects in the city capital and districts and sub-districts. Studies and designs for sewer and storm water networks should be developed by experienced companies and advisory offices which should also supervise the implementation of projects.

Item	Standard	Description	Unit of standard	Needed information to measure the standard	Description	Unit of measurement
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- Joint committee of different service directorates should be formed to develop and agree on maps on service sites for each directorate to ensure consistency between the works of the directorate and other directorates.
- Directorate vehicles should be supplied with GSP to increase their efficiencies;
- The private sector should share costs of networks for their use of treated sewer water in the irrigation of some cash crops. Lands may be granted to them for free to cultivate such crops. The private sector must be involved by granting private companies tax exemption;
- In relation with the problems concerning information connected with sewer services and their costs and funding, we suggest the following:
 - Experienced research centers to be assigned with conducting feasibility studies in social, economic, and technical fields before the implementation of a project;
 - Create a database to be updated on annual basis related to access to sewer services;
 - Conduct an extensive field study on how far citizen in different areas are ready to share costs for the provision of sewer services; and
 - Design and develop a GIS for the city, especially for the sewer network and storm water, and combine descriptive and spatial data in a unified geographic database. This database is to include all information related to infrastructure of the sewer network and storm water, and other demographic, geographic, and environmental information.

Conclusion

It is important that the Directorate of Sewer manage its works in an effective and efficient way in order to provide better services to citizens using available resources. Further, the Directorate should develop a realistic strategic plan and feasibility studies for projects to be implemented in order to reduce gaps in service standards, leading to better services. Lastly, the Directorate of Sewer should be enabled to find financial resources to support its operational budget and assist it in enforcing applicable laws to prevent illegal uses against the sewer network.

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1	Level of coverage by sewer disposal networks	This standard represents extension of embedded sewer disposal networks to include each house or facility whether trading, industrial and other facilities in the district	%	A. total number of housing units or facilities in the district	Housing units or facilities that are registered with directorates of real estate registration or those to whom construction permits were issued	Number
				B. total number of housing units of facilities that have direct connection with network of sewer disposal	Housing units and facilities that are subscribed or connected with network of sewer disposal Housing units and facilities that are connected with network of rainwater discharge or these with open discharge channels are not counted	Number
				Periodical updating $100 \times \frac{B}{A} =$ indicator calculation		%
2	Efficiency of the network to discharge wastewater	This standard measures quantity of wastewater that is discharged through the network in	%	A. Quantity of water provided to citizens on a monthly or daily basis	Measure the quantity of product on a monthly or daily basis which is pumped into the network on a monthly	Million liters on a monthly or daily basis

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		proportion to total quantity of water provided through water networks to citizens within area of service			or daily basis with daily measurement taking into consideration losses in the network or carrier lines (25% in minimum)	
				B. quantity of wastewater discharged through the network	Quantity of wastewater at entrance of treatment projects	Million liters on a monthly or daily basis
				$\left(\frac{B}{A} \times 0.75\right) \times 100 =$ indicator calculation		%
3	capability to treat wastewater	Capability of secondary treatment of wastewater produced from use of water supplied by water projects	%	A. quantity of water supplied to citizens through the network on a monthly or daily basis	Measure the quantity of product on a monthly or daily basis which is pumped into the network on a monthly or daily basis with daily measurement taking into consideration losses in the network or carrier lines (estimated 25% in minimum)	Million liters on a monthly or daily basis

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				B. real capacity of treatment of wastewater	Calculate the real capacity of wastewater treatment projects within the same month	Million liters on a monthly or daily basis
				Annual update $\left(\frac{B}{A} \times 0.75\right) \times 100 =$ indicator calculation		%
4	efficiency of treatment of wastewater (BOD<20mg/l, TSS=60mg/l, COD<100mg/l, PH=6.5-8.5)	The efficiency of treatment of water is measured through checking the percentage of samples inspected from secondary treatment output to see if they comply with or exceed the standards	%	A. total number of samples tested within a month	Number of samples drawn during a month from secondary treatment unit output by directorates of environment, health or any relevant authority within a period of month	Number
				B. total number of samples tested which comply with the standard specifications within the month	Out of total number of samples drawn in the item above, number of samples tested and which comply with standard specifications	Number

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				$Monthly\ update\ 100 \times \frac{B}{A}$ = indicator calculation		%
5	Efficiency of responding to people complaints	Total number of complaints concerning water supply which are addressed within 24 hours from receiving of complaint	%	A. total number of all complaints received from citizens during a month period	Complaints registered at office of complaints in effective systems of registration and tracking	Number
				B. total number of complaints considered and handled during a month period of time	The number of complaints handled in a sound and satisfactory manner during 24 hours or after a day from registering the complaint	Number
				$Monthly\ update\ 100 \times \frac{B}{A}$ = indicator calculation		%

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Annex No.1: Standards approved by the sewer directorate in the province.

S. No.	District /sub-district	Criterion of the extent of sewer networks coverage		Criterion of networks efficiency to discharge wastewater		Criterion of ability to sewer treatment		Criterion of efficiency of wastewater treatment		Criterion of the extent of efficiency of dealing with citizens'' complaints	
		Indicator	Gap	Indicator	Gap	Indicator	Gap	Indicator	Gap	Indicator	Gap
1	Al-Diwaniyah	30%	70%	85%	15%	50%	50%	10%	90%	87%	13%
2	Al-Sadeer	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
3	Al-Saniyah	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
4	Al-Shannafiya h	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
5	Al-Sallahiya h	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
6	Al-Mahanawiyah	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
7	Sumar	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
8	Nafar	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
9	Al-Hamzah	6%	94%	80%	20%	0%	100%	0%	100%	80%	20%
10	Al-Shamiyah	14%	86%	80%	20%	0%	100%	0%	100%	80%	20%
11	Efaq	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
12	Al-Bdair	92%	8%	85%	15%	80%	20%	25%	75%	80%	20%
13	Al-Daghara	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
14	Al-Shafeiyah	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%
15	Ghammas	0%	100%	0%	100%	0%	100%	0%	100%	0%	100%

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Annex No.2: The indicator and gap for all the administrative units for wastewater discharge service.

S. No.	District/ sub-district	Criterion of the extent of storm water networks coverage		Criterion of networks efficiency to discharge storm water		Criterion of the extent of efficiency of dealing with citizens'' complaints	
		Indicator	Gap	Indicator	Gap	Indicator	Gap
1	Al-Diwaniyah	39%	61%	80%	20%	80%	20%
2	Al-Sadeer	0%	100%	0%	100%	0%	100%
3	Al-Saniyah	0%	100%	0%	100%	0%	100%
4	Al-Shannafiyah	0%	100%	0%	100%	0%	100%
5	Al-Sallahiyah	0%	100%	0%	100%	0%	100%
6	Al-Mahanawiyah	0%	100%	0%	100%	0%	100%
7	Sumar	0%	100%	0%	100%	0%	100%
8	Nafar	0%	100%	0%	100%	0%	100%
9	Al-Hamzah	10%	90%	80%	20%	80%	20%
10	Al-Shamiyah	30%	70%	80%	20%	80%	20%
11	Efaq	10%	90%	80%	20%	80%	20%
12	Al-Bdair	15%	85%	85%	15%	80%	20%
13	Al-Daghara	0%	100%	0%	100%	0%	100%
14	Al-Shafeiyah	0%	100%	0%	100%	0%	100%
15	Ghammas	12%	88%	80%	20%	80%	20%

Service sector –SDIP of sewersector

Annex No. 3: the indicator and the gap for all the administrative units for storm water service

S. No.	Vehicle type	operable vehicles	Need	Notes
1	Sewer vacuum truck	40	55	
2	Septic tanker	65	56	
3	Excavator	2	9	
4	Multi-purpose excavator	8	51	
5	Trailer	1	2	
6	Dunpar	1	50	
7	Crane	2	20	
8	Sewer Suction truck	7	27	

Service sector –SDIP of sewersector

Annex No. 4: The number of specialized working vehicles and the total need of the Al-Diwaniyah Sewer directorate and districts and sub-districts.

- Cadres of stations unit.

S. No.	Job title	Permanent staff	Contract
1	Engineer	1	2
2	Technician	1	5
3	Operator	42	40
4	Worker	6	6
5	Guard	25	11
6	Administrative employee	4	8

- Cadres of the projects unit

S. No.	Job title	Permanent staff	Contract
1	Engineer	4	3
2	Technician	14	2
3	Operator		
4	Worker	37	3
5	Guard		1
6	Administrative employee	7	3

- Cadres of networks unit

S. No.	Job title	Permanent staff	Contract
1	Engineer	3	1
2	Technician	1	
3	Operator	23	3
4	Worker	2	
5	Guard	8	
6	Administrative employee	3	3

Annex No.5: The number of cadres in the treatment station, project unit, and networks unit.