



Coastal Municipalities Water Utility (CMWU)



Storm Water Flood in the Gaza Strip Damage Assessment Report (10 Dec. to 14 Dec. 2013)



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INTRODUCTION:

Gaza Strip has been suffering from Israeli siege (limited goods access through the Gaza Commercial Gates), suffering from frequent electricity cut-off which extends to 16 hours a day . On 10 Dec. Gaza Strip faced a rainy and windy thunder storm that never occurred in the Gaza Strip for more than 140 years , where the available meteorological stations did not forecast its rainfall quantities and distribution as occurred during the storm time (4 days).

Before and during the thunder storm period, the electricity was on for 6-8 hours a day in most of Gaza Strip areas, where Rafah and Khan Younis have the worst situation in electricity since the main supply of electricity comes from Egypt and it was off before and during the thunder storm because of maintenance works at the Egyptian side, also the two feeders from Israel were cut-off as the affect of the storm

Heavy intensity storm has caused formation of lagoons in some areas in the Gaza Strip especially in lowest points where some people are living .

Ministry of health reported more than 48 injures and more than 1,500 families have evacuated their homes.

Before the thunder storm, CMWU has taken the necessary precautions by distributing fuel to all storm water and wastewater facilities all over the Gaza Strip funded by OCHA, and by Turkish donation. Added to that, cleaning of rainfall gullies in different areas and distribution of safety tools. Also, eight mobile pumps were distributed for the risky flooded areas with a capacity ranges from 150m³/h to 250m³/h.

During the thunder storm events, CMWU technical team was engaged in the field by distributing 84,000 litres of fuel donated through UNICEF, ICRC, and OCHA; supply Gaza city with safety shoes and tools and supply spare parts and needed equipments from CMWU main warehouse to all Gaza Strip cities. Added to that, supply another four additional mobile pumps through OCHA in cooperation with PWA from the Israeli side.

After the storm cease , CMWU technical team has visited all storm water and waste water facilities for damage assessment for the remedy actions and future precautions. The following sections illustrate what has been carried out during the storm and the assessment needs for each governorate.

1- NORTH GOVERNORATE

The affected areas were surrounding Abu Rashed lagoon areas, Al Saftawi lagoon area, Al Shekh Rodwan Area South Jabalia, near The American school area, Aslan and al Mashroo

Kind of support:

- Hire a generator 110KVA for Om Al Nasser municipality.
- Repair 150 KVA at Yafa water well in Jabalia.
- Supply a mobile pump at Al Saftawee pond- Jabalia
- Supply and install Flygt submersible pump at Al Karama PS and repair the damaged one- Jabalia.
- Supply and install spare parts to repair Abu Rashed pump – Jabalia
- Supply electrical cable of 100m length at Abu Rashed pond – Jabalia.
- Fuel for all mobile pumps, generators, beside all wastewater and storm water facilities.

Cost Estimate: 70,000 USD

Beneficiary: 100,000 inhabitants

Damage Assessment Photos:



Near Abu Rashed Pond





Saftawee Area



Near Sheikh Radwan - South Jabalia

Assessment Needs for the Northern Governorate:

Description	Cost Estimate USD
Repair and maintain for all the heavy vehicles such as loader, excavators, tankers, suction trucks, jitters, etc.)	20,000
Overhauling of the existing mobile pumps	5,000
Supply gullies and cast iron manhole covers of different sizes	10,000
10 Ton Cement and aggregates for maintenance work (fix gullies and manholes maintenance)	5,000
General urgent maintenance works (mechanical and electrical) at different wastewater pumping stations and water facilities	50,000
Supply submersible pump of 3" diameter for Beit Hanon	1,000
Supply generator for Abu Rashed P S 500KVA	80,000
Construction work to build a new control room at Abu Rashed P S and transfer the existing panels	40,000
Total	211,000

2- GAZA GOVERNORATE

The affected areas were Al Nafaq Street, Al Zaytoon , Beach Camp, and Al Moghraqa area

Kind of support:

- 50 pair of Safety shoes and water proof coats were distributed to Gaza Municipality's staff
- Two mobile pumps one at Al Sheikh Radwan pond and the other at Al Nafaqq Street to accelerate the evacuation process.
- Fuel for mobile pumps and generators besides the wastewater facilities.
- Spare parts for P S 7B, 5, and 6 A including mechanical seals, impellers, etc
- ABS sewage new pump for Al Sameer pump station.

Cost Estimate: 110,000 USD

Beneficiary: 200,000 inhabitants

Damage Photos:



Nafaq St.



Shaikh Radawan Pond



Nafaq St.





Al Zaytoon Area

Assessment Needs for the Gaza Governorate:

Description	Cost Estimate USD
Repair and maintain for all the heavy vehicles such as loader, excavators, tankers, suction trucks, jitters, etc.)	200,000
Emergency works to Maintain Al Samer P S No. 6A	70,000
Overhauling of the existing mobile pumps	50,000
Supply gullies and cast iron manhole covers of different sizes	50,000
20 Ton Cement and aggregates for maintenance work (fix gullies and manholes maintenance)	10,000
Supply small mobile pumps 3" of 100 m3/hr to evacuate homes No. 15	120,000
Total	500,000

3- MIDDLE AREA GOVERNORATE

The affected areas were at Wadi Al Salqa, Al Berka area and near Al Aqsa hospital in Deir Al Balah

Kind of support:

- Mobile pump to evacuate the flooding areas.
- Two electrical submersible pumps at Al Berka area in Deir Al Balah.
- Fuel for mobile pumps and generators besides the wastewater facilities.

Cost Estimate: 50,000 USD

Beneficiary: 50,000 inhabitants

Damage Photos:



Salah AlDeen St.



Yafa St.



Al Aqsa St.



Wadi Salqa Square

Assessment Needs for the Middle Governorate:

Description	Cost Estimate USD
Repair and maintain for all the heavy vehicles such as loader, excavators, tankers, suction trucks, jitters, etc.)	30,000
Overhauling the mobile pump	10,000
Supply gullies and cast iron manhole covers of different sizes	10,000
10 Ton Cement and aggregates for maintenance work (fix gullies and manholes maintenance)	5,000
Repair the electrical panel and the sluice gate valve on the over flow of Al Moghraqa P S	3000
Repair the electrical panel of Khaled water well in Al Zawayda	10000
Replace the electrical motor of water well No S71 at Al Maghazi	10000
Repair works at Al P S in Al Zawaida	3000
Repair the floating switch at Block 7 P S, and repair the electrical panel for block 12 P S at Al Buraij.	3000
Maintenance works at al Hasaina P S in Al Zawayda	80,000
Total	164,000

4- KHAN YOUNIS GOVERNORATE

The affected areas were at Bani Suhaila, Abasan, Al Qarara, Al Fokhare and Khan Younis Camp

Kind of support:

- Use one mobile pump to evacuate the flooded areas at Bani Suhaila.
- Repair the submersible pumps at al Wafya PS, and Hesbit Al Samak
- A mobile pump was used at Al Fukharee town to evacuate Al Eskin area.
- Repair the existing mobile pump
- Four pumps (200m³/hr each) were installed at Al Amal site by CMWU to evacuate water from the pond to the nearby sand dunes to reduce its level and ACF provide two additional pumps (100m³/hr each to accelerate the evacuation process.
- Fuel for mobile pumps and generators besides the wastewater facilities.

Cost Estimate: 100,000 USD

Beneficiary: 70,000 inhabitants

Damages Photos:



Bani Suhaila



Al Amal Pond



Al Qarara

Assessment Needs for Khan Younis Governorate:

Description	Cost Estimate USD
Repair and maintain for all the heavy vehicles such as loader, excavators, tankers, suction trucks, jitters, etc.)	30,000
Overhauling the two mobile pumps at Al Araysheya P S	16,000
Maintain the existing mobile pumps 3 HP at Khozaa	2,000
Supply gullies and cast iron manhole covers of different sizes	10,000
Cement and aggregates for maintains works (10 Ton)	5,000
Total	63,000

5- RAFAH GOVERNORATE

The most affected areas were at Al Junina, Tal Alsultan, and Jemez et AL Sabeel districts.

Kind of support:

- Hire a generator to operate the mobile pump in order to evacuate Jemez et AL Sabeel area.
- Hire loaders to transfer sand around the storm water to protect the houses.
- Spare parts and mechanical works and repairs at Jemez et ALSabeel P S and Al Juninah P S.
- Procure and supply hoses for the mobile pumps.
- Fuel for mobile pumps and generators besides the wastewater facilities.

Estimate Cost: 30,000 USD

Beneficiary: 65,000 inhabitants

Damage Photos:



Al Junina



Jemezet Al Sabeel

Assessment Needs for Rafah Governorate

Description	Cost Estimate USD
Repair and upgrade Jemezit Al Sabil pumping station	150,000
Repair and maintain for all the heavy vehicles such as loader, excavators, tankers, suction trucks, jitters, etc.)	25,000
Repair electrical motor of water well P148	15,000
Repair the walls of Tal El Sultan pumping station	20,000
Supply gullies and cast iron manhole covers of different sizes	10,000
Cement and aggregates for maintains works (10 Ton)	5,000
Supply 400 KVA generator with all electrical accessories for Jemezit Al Sabeel P S	80,000
Total	305,000

List of Direct Damages on Storm Water and Waste Water Facilities:

- 1- Many of the electrical panels and electrical generators in some of CMWU water and wastewater facilities were burnt or partially damaged due to storm water drops for instant at Al Awqaf Water Well at Beit Hanon , Abu Rashed P S electrical panel at Jabalia, and Al Sultan PS at Beit Hanon, PS7B in Gaza city.
- 2- Breakdown for the submersible pumps at different wastewater sites due to the heavy loads of sewage mixed with sandy storm water at Jemez Al Sabeel P S in Rafah, Hesbet Al Samak, and Al Wafya P S at Khan Younis , Al Samer PS, and Al Zaytoon (7B) P S in Gaza city for example.
- 3- Shortage of some equipment and spare parts from CMWU main warehouses used for urgent maintenance or replacements during the storm.
- 4- Over usage of the mobile pumps and the mobile generators during the storm raise the need to maintain and overhaul all the pumps.

Summary Table of All CMWU interventions and Emergency needs during the stormy days

Governorate	Municipality	Intervene cost \$	Total Beneficiaries	Emergency Needs cost \$
North	Beit Hanon	6,000	100,000	211,000
	Beit Lahia	7,000		
	Jabalia	55,000		
	Om Al Nasser	2,000		
Gaza	Gaza	110,000	200,000	500,000
Middle Area	Deir Al Balah	30,000	50,000	164,000
	All other municipalities	20,000		
Khan Younis	Bani Suhaila	30,000	70,000	63,000
	Al Fokhari	25,000		
	Khan Younis	45,000		
Rafah	Rafah	30,000	65,000	305,000
Total		360,000	485,000	1,243,000

Future Contingency Needs:

**Urgent Needs to Support CMWU Management in the Rainy Season to
Assist the Municipalities**

SN	Description	Cost Estimate USD
1.	Fuel for pumping stations – Urgent 250,000 Litre per month (Zero VAT)	250,000
2.	Service contract to evacuate and reduce the levels at the main storm water ponds such as AlSheikh Radwan, Al Amal, and Asqoola.	250,000
3.	Mobile fuel tank of capacity 5000 litre # 2	90,000
4.	Mobile pumps of capacity 500m ³ /hr and diameter 8" no. 6	300,000
5.	Mobile pumps of capacity 250m ³ /hr and diameter 6" no. 6	240,000
6.	Mobile pumps of capacity 100m ³ /hr and diameter 4" no. 6	180,000
7.	Mobile submersible pumps of capacity 20m ³ /hr no. 20	100,000
8.	Additional hoses for the mobile pumps of different diameters 4", 6", and 8" inches of total length about 1000 meter for each	120,000
9.	Generators (88 KVA # 5 , 110 KVA # 5, 250 KVA # 2 , and 400 KVA # 2	450,000
10	Safety tools and equipments	100,000
11	Suction trucks no. 2	300,000
12	Backhoe loader no. 5	1,000,000
13	Emergency rubber boats of size 5x2 meter no. 5	10,000
14	Spare parts and equipments (pumps, fittings, hoses, pipes, electrical cables,...etc)	1,000,000
Total		4,390,000

Lessons Learnt & Next Step:

Before and after the storm, CMWU in cooperation with all related technical and managerial staff at different municipalities have taken all necessary precautions and mitigations to minimize the effect of thunder storm destruction, but the storm was un-predictable in its rainfall intensity where continuous rainfall was noticed during the whole days of the storm event. Without the preparedness program the damages could have been worse. To install mitigation measures in the future to avoid the storm risks, lessons learnt such as;

- 1- Activate an emergency response plan from all related sectors.**
- 2- A master plan for each municipal area should be developed.**
- 3- A fund appraisal for storm water investment projects shall be prepared.**
- 4- Training water/wastewater technical staff for emergency cases.**
- 5- The existing heavy trucks are old and need to be replaced.**
- 6- Provide more mobile pumps with higher capacities.**
- 7- Allocate and save enough quantities of fuel at different water and wastewater facilities, heavy field equipments and trucks.**
- 8- Support CMWU for more spare parts and equipments to handle such events.**
- 9- Storm water and waste water should be separated completely.**
- 10- Solve the electricity problem for the water and wastewater facilities by isolating their normal grid with those facilities.**

Therefore, and as the next step, CMWU will propose list of strategic storm water projects in order to improve the capacity of rainfall harvesting and recharging which will improve the underground water quality and quantity; following are list of these projects:

**Line items storm water proposed projects to mitigate the
repetition of flooding**

SN	Project	Location	Cost Estimate USD
1	Separate the connection between Al Junina pumping station and Jemez Al Sabeel pumping station(including upgrading) to another infiltration basins (pipelines and infiltration lagoons)	Rafah	2,400,000
2	construction new pumping station in the western part of Rafah city	Rafah	1,500,000
3	Storm water pumping station and pressure line to an infiltration basin (complementary project to the ongoing by PALTEL)	Khan Younis	1,500,000
4	Upgrading Al sheikh Radwan pond and P S no. 4 and Construction a pressure line to the sea	Gaza	2,500,000
5	Upgrading the wastewater pumping stations Mahader, Aslan, Al Karama....	North	2,000,000
6	Construction a box culvert at Wadi Al Saqa to abandon the flood	Middle Area	500,000
7	Construction a gravity line from Salah Al Deen street to the UNRWA P S	Middle Area	500,000
Total			10,900,000