# APPENDIX I

# SCHEME DATA SHEETS

# Scheme Data Sheets

| Scheme Reference Number | Title of Scheme |
|---|---|
| WW01 | Saida |
| WW02 | Sarafund |
| WW03 | Sour |
| WW04 | Naqoura |
| WW05 | Jbaa |
| WW06 | Nabatiyeh |
| WW07 | Nabaa El-Tasseh |
| WW08 | Chaqra |
| WW09 | Tibnine |
| WW10 | Bint Jbeil |
| WW11 | Marjayoun |
| WW12 | Jezzine |
| WW13 | Braiqaa-Maifadoun |
| WW14 | Kfar Sir |
| WW15 | Hallousieh |
| WW16 | Srifa |
| WW17 | Wadi Slouqi |
| WW18 | Yohmor |
| WW19 | Zaoutar |
| WW20 | Deir Mimes |
| WW21 | El Aachiyeh |
| WW22 | Kafra |
| WW23 | Rihane |
| WW24 | Mimes |
| WW25 | Hasbaya |
| WW26 | Hebbariyeh |
| WW27 | Kaoukaba |
| WW28 | Rachaya El Foukhar |
| WW29 | Kfarshouba |
| WW30 | El Meri |
| WW31 | El Wazzani |
| WW32 | Chebaa |

## GENERAL NOTE

- All in-locality collection networks proposed in the South Lebanon Wastewater Master Plan will have approximately 80% of the pipelines of 200 mm diameter and 20% of the pipelines of 300 mm diameter.

- At later advanced stages of studies (Feasibility Studies, Environmental Impact Assessment, and Detailed Design), wastewater characterization must be carried out for all schemes whether they have been previously studied by previous Consultant or newly proposed in the Master Plan by RELK&P.

- It should be noted that at this stage of study, several schemes have no proposed pumping/lift stations as the alternative of gravity-driven wastewater flow was adopted in the process of development of the Master Plan. However, pumping/lift stations might be proposed in the Detailed Design stage (where deemed necessary).

- It should be noted that the schemes which were studied by previous Consultants were revised by RELK&P and wherever necessary additional remarks were made by RELK&P as seen below.

- It should be noted that the populations applied for these 32 schemes are those that are determined by the Central Administration for Statistics (CAS) which are based on the total number of households per Muhafaza. These figures are projected to obtain population equivalent figures for the year 2030.

# SAIDA SCHEME

<table>
<tr><td>WW01</td><td>South Lebanon Wastewater Master Plan – Saida Scheme</td></tr>
<tr><td>Number of localities served</td><td>90</td></tr>
<tr><td>Localities served</td><td>Saida, Ain El Heloue, Ghaziye, Hara, Hlaliye, Miye ou Miye, Bqosta, Aabra, Aanqoun, Aaqtanit, Ain Ed Delb, Ain El Mir, Bayssour, El Bramiye, Choualiq, Darb Es Sim, Jinsnaya, Kefraya, Kfarfalous, Kfar Jarra, Lebaa, Maamariye, Maghdouche, Majdelyoun, Ouadi Baanqoudain, Qennarit, Qraiye, Salhiye, Karkha, Tambourit, Houmine et Tahta, Zahrani, Mrah el Hbas, Jernaya, Kfar Chellal, Kfar Beit, Berti, Haitoule, Ouadi El Laimoun, Hassaniye, Mharbiye, Kfarhatta, Mjeidel, Zaghdraya, Arab Ej Jall, Arab Tabbaya, Bnaafoul, Mazraat Zeita, Mazraat Jinjlaya, Mazraat el Qnaitra, Roumine, Aazze, Erkay, Khzaiz, Roum, Aazour, Anane, Qaitoule, Homsiye, Haidab, Saidoun, Rimat, Sanaya, Mrah Bou Chdid, Maknouniye,</td></tr>
<tr><td>Previously studied by</td><td>RELK&P – 1996 (Coastal Area Detailed Design)<br>RELK&P – 2004 (Preliminary design for extension)</td></tr>
<tr><td>Design population</td><td>2005 Population: 251,943<br>2030 Population Equivalent: 554,237</td></tr>
<tr><td>Daily Average Flow</td><td>1,025 l/s</td></tr>
<tr><td>Peak flow</td><td>1,958 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>In the Saida scheme, there are existing pipelines as detailed below. There is also a proposal by RELK&P to extend the Saida scheme to include additional localities.<br><br>Existing:<br><br>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>7.44</td><td>200</td></tr>
<tr><td>Pipelines</td><td>15.95</td><td>300</td></tr>
<tr><td>Pipelines</td><td>0.67</td><td>400</td></tr>
<tr><td>Pipelines</td><td>1.12</td><td>500</td></tr>
<tr><td>Pipelines</td><td>1.18</td><td>600</td></tr>
<tr><td>Pipelines</td><td>1.96</td><td>700</td></tr>
<tr><td>Pipelines</td><td>0.78</td><td>800</td></tr>
<tr><td>Pipelines</td><td>1.87</td><td>1000</td></tr>
<tr><td>Pipelines</td><td>67.91</td><td>Old Existing System</td></tr>
<tr><td>Total Length</td><td>98.92</td><td></td></tr>
</table>
<br>Partially Implemented (to complete execution later):<br><br>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>44</td><td>300 mm</td></tr>
<tr><td>Total Length</td><td>44</td><td></td></tr>
</table>
<br>Proposed:<br><br>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>35.47</td><td>200</td></tr>
<tr><td>Pipelines</td><td>96.23</td><td>300</td></tr>
<tr><td>Pipelines</td><td>9.89</td><td>400</td></tr>
<tr><td>Pipelines</td><td>12.15</td><td>500</td></tr>
<tr><td>Pipelines</td><td>5.04</td><td>600</td></tr>
<tr><td>Pipelines</td><td>2.77</td><td>700</td></tr>
<tr><td>Total Length</td><td>161.57</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>736 km</td></tr>
</table>

<table>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Item</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping/lift stations**</td><td>10</td></tr>
</table>
** 10 pumping/lifting stations are operational in the Saida scheme; they are located at the coastal area
</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design Capacity</td><td>88,560 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Existing: a Primary Teatment plant at present, completed but not commissioned yet<br>Proposed: upgrade to secondary treatment; Aerobic Treatment, Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Existing – on the right bank of the Sainiq River and it is operational</td></tr>
<tr><td>Additional Remarks</td><td>There are two treatment plants by USAID existing in Berti and Snayyah and they are both operational.</td></tr>
</table>

## SARAFUND SCHEME

<table>
<tr><td>WW02</td><td>South Lebanon Wastewater Master Plan – Sarafund Scheme</td></tr>
<tr><td>Number of localities served</td><td>62</td></tr>
<tr><td>Localities served</td><td>Sub-scheme 1:<br>Khartoun, Ghassaniyeh, M Kaouthariyet Essiyad, Ech Charqiyeh, Mazraat Sinai, Insar, Mazraat El Qraiye, Mazraat Deir Mar Taqla, Ez Zrariye, Mazraat Kaouthariyet erriz, Mazraat Jamjim, Arzai, Matariyet Ech Choumar, El Kharayeb, Mazraat El Ousta<br><br>Sub-scheme 2:<br>Deir Ez Zahrani, Kfaroua, En Nmairiye, El Hajje, Zefta, En Najjariye, Mseileh, Maamriyet El Kharab, El Addoussiye, El Marouaniye, Tefahta, Bissariye, Yarine, Mazraat El Aaqbiye, Babliye, Khirbet Ed Douair, Qaaqaiyet Es Snoubar, Sarafund, Saksakiye, Loubiye, Insariye, Aadloun</td></tr>
<tr><td>Previously studied by</td><td>GETI – 2005 (Feasibility Study)</td></tr>
<tr><td>Design population</td><td>Sub-scheme 1:<br>2005 Population: 44,549<br>2030 Population Equivalent: 102,631<br><br>Sub-scheme 2:<br>2005 Population: 84,629<br>2030 Population Equivalent: 183,154</td></tr>
<tr><td>Daily Average Flow</td><td>560 l/s</td></tr>
<tr><td>Peak flow</td><td>1,342 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>Sub-scheme 1:<br><br>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>76.05</td><td>200</td></tr>
<tr><td>Pipelines</td><td>21.10</td><td>250</td></tr>
<tr><td>Pipelines</td><td>2.82</td><td>300</td></tr>
<tr><td>Pipelines</td><td>7.69</td><td>350</td></tr>
<tr><td>Pipelines</td><td>5.42</td><td>400</td></tr>
<tr><td>Pipelines</td><td>5.04</td><td>500</td></tr>
<tr><td>Pipelines</td><td>0.99</td><td>700</td></tr>
<tr><td>Total Length</td><td>119.11</td><td></td></tr>
</table>
Sub-scheme 2:<br><br>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>120.09</td><td>200</td></tr>
<tr><td>Pipelines</td><td>7.24</td><td>250</td></tr>
<tr><td>Pipelines</td><td>16.96</td><td>300</td></tr>
<tr><td>Pipelines</td><td>4.84</td><td>350</td></tr>
<tr><td>Pipelines</td><td>5.17</td><td>400</td></tr>
<tr><td>Pipelines</td><td>11.51</td><td>450</td></tr>
<tr><td>Pipelines</td><td>1.55</td><td>500</td></tr>
<tr><td>Pipelines</td><td>1.74</td><td>700</td></tr>
<tr><td>Pipelines</td><td>1.32</td><td>800</td></tr>
<tr><td>Pipelines</td><td>0.32</td><td>900</td></tr>
<tr><td>Total Length</td><td>170.74</td><td></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>In-Locality Collection Network</td><td>Sub-scheme 1:<br>169 Km<br><br>Sub-scheme 2:<br>301 Km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Item</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping and lifting stations</td><td>4</td></tr>
<tr><td>2</td><td>Pumping and lifting stations associated with the two (2) treatment plants</td><td>2</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design Capacity</td><td>48,384 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Sampling was conducted between 15 Nov 2004 and 15 Jun 2005 on two untreated WW streams discharging at El Aaqbiye and En Nmairiye. Seventeen untreated WW grab samples were collected and analyzed. The tested WW was found to be predominately domestic with medium to high strength.<br><br>
<table>
<tr><th rowspan="2">Parameter</th><th colspan="3">El Aaqbiye</th><th colspan="3">En Nmairiye</th></tr>
<tr><th>Ave</th><th>Min</th><th>Max</th><th>Ave</th><th>Min</th><th>Max</th></tr>
<tr><td>$BOD_5$ (mg/l)</td><td>238.0</td><td>120.0</td><td>350.0</td><td>213.2</td><td>81</td><td>327</td></tr>
<tr><td>TSS (mg/l)</td><td>152.4</td><td>76.0</td><td>247.0</td><td>150.2</td><td>70</td><td>246</td></tr>
<tr><td>F Coliform (No./100ml)</td><td>57,553</td><td>1,400</td><td>93,000</td><td>48,765</td><td>5,000</td><td>99,000</td></tr>
</table>
<br>The Consultant proposed to adopt the following influent WW characteristics:<br>$BOD_5$ 360 mg/l<br>TSS 360 mg/l<br>Fecal Coliform $6 \times 10^6$/100 ml</td></tr>
<tr><td>Proposed WW treatment process</td><td>- First phase: preliminary treatment with sea outfall (2.90 km).<br>- Second phase: the treatment process should be extended to include activated sludge with primary sedimentation.<br>Sludge treatment: gravity sludge thickeners, anaerobic sludge digestion, and centrifugation for sludge dewatering.<br>The WWTP will follow the Extended Aeration Activated Sludge method with possible reuse of the treated effluent in irrigation.</td></tr>
<tr><td>Proposed location of WWTP</td><td>The first treatment plant will be located just south of the Zahrani Refinery in Mazraat Brak et Tall. The second treatment plant will be located in the Abou El Aswad costal plain area. The centralized WWTP will be located south of the Zahrani Refinery in Mazraat Brak et Tall. The total area required for these plants is approximately 53,000$m^2$.</td></tr>
<tr><td>Additional Remarks</td><td>-</td></tr>
</table>

## SOUR SCHEME

<table>
<tr><td>WW03</td><td>South Lebanon Wastewater Master Plan – Sour Scheme</td></tr>
<tr><td>Number of localities served</td><td>58</td></tr>
<tr><td>Localities served</td><td>Aabbassiye, Aaitit, Aain Baal, Arzoun, Bedyas, Bafliye, Barich, Batoulay, Bestiyat, Borj Ech Chemali, Borj Rahal, Charbriha, Chehour, Deir Qanoun (Smaiye), Deir Qanoun En Nahr, Derdghaiya, El Bazouriye, El Bourghliye, El Haouch, Er Rachidiye, Es Smaiye, Hanaouy, Jennata, Kneisse, Maachouq, Maarake, Maaroub, Qana, Ras El Aain, Rechknaney, Rmadiye, Saddiqine, Sour El Bass, Tair Debbe, Toura, Yanouth, Kfardounine, Chehabiye, El Mjadel, Jonaya, Debaal, Deir Ntar, Mahrouna, Silaa, Mazraat Michrif, Deir Aamas, El Bayad, Ouadi Jilo</td></tr>
<tr><td>Previously studied by</td><td>Laymeyer - 1994<br>Khalil Barakat – year NA<br>RELK&P – 1996</td></tr>
<tr><td>Design population</td><td>2005 Population: 238,890<br>2030 Population Equivalent: 517,843</td></tr>
<tr><td>Daily Average Flow</td><td>973.54 l/s</td></tr>
<tr><td>Peak flow</td><td>1,888.68 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>* In Sour there are existing pipelines as detailed below. There is also a proposal to extend the Sour scheme to include additional localities.<br><br>Existing:<br><br>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>22.41</td><td>Old Existing System</td></tr>
<tr><td>Pipelines</td><td>6.49</td><td>200</td></tr>
<tr><td>Pipelines</td><td>2.08</td><td>300</td></tr>
<tr><td>Pipelines</td><td>1.18</td><td>400</td></tr>
<tr><td>Pipelines</td><td>4.72</td><td>600</td></tr>
<tr><td>Pipelines</td><td>3.64</td><td>700</td></tr>
<tr><td>Pipelines</td><td>5.28</td><td>800</td></tr>
<tr><td>Pipelines</td><td>0.90</td><td>900</td></tr>
<tr><td>Pipelines</td><td>0.93</td><td>1000</td></tr>
<tr><td>Pipelines</td><td>1.25</td><td>1200</td></tr>
<tr><td>Total Length</td><td>48.90</td><td></td></tr>
</table>
Proposed:<br><br>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>90.67</td><td>200</td></tr>
<tr><td>Pipelines</td><td>3.63</td><td>250</td></tr>
<tr><td>Pipelines</td><td>43.55</td><td>300</td></tr>
<tr><td>Pipelines</td><td>20.76</td><td>400</td></tr>
<tr><td>Pipelines</td><td>22.11</td><td>500</td></tr>
<tr><td>Pipelines</td><td>5.09</td><td>600</td></tr>
<tr><td>Pipelines</td><td>11.81</td><td>700</td></tr>
<tr><td>Pipelines</td><td>0.84</td><td>800</td></tr>
<tr><td>Pipelines</td><td>1.27</td><td>1200</td></tr>
<tr><td>Total Length</td><td>199.73</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>630 Km</td></tr>
</table>

<table>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Items</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping/Lift Stations*</td><td>8</td></tr>
</table>
*There exist 8 pumping / lift stations that are operational in the area of Sour.
</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>84,154 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

## NAQOURA SCHEME

| **WW04** | **South Lebanon Wastewater Master Plan – Naqoura Scheme** |
|---|---|
| Previously studied by | Ecofluid – 2004 (not adopted) |

*The Scheme of Naqoura is subdivided into four sub-schemes; for each scheme the total lengths of the wastewater network and the treatment features are defined separately as indicated in the sections below.*

| **Sub-scheme 1** | **South Lebanon Wastewater Master Plan – Naqoura Scheme**<br>**Sub-scheme 1 of 4** |
|---|---|
| Number of localities served | 7 |
| Localities served | Zheiriye, El Malkiye, El Biyada, Majdel Zoun, Chamaa, El Henniye, Aaziye, El Mansouri, El Qleile |
| Design population | 2005 Population: 16,941<br>2030 Population Equivalent: 36,351 |
| Daily Average Flow | 59.25 l/s |
| Peak flow | 178.94 l/s |
| ***Network*** | |
| Main Collectors | **Collectors** / **Length (km)** / **Diameter (mm)**<br>Pipelines / 14.21 / 300<br>Pipelines / 6.67 / 400<br>**Total Length** / **20.88** / |
| In-Locality Collection Network | *Sub-scheme 1:*<br>*66 Km* |
| Pumping/Lift Station (s) | No pumping stations have been proposed by RELK&P at this stage of study. |
| ***Treatment*** | |
| Design capacity | 5,119m3/day |
| WW characterization | Wastewater characterization was not carried out at this stage of study. (refer to general notes). |
| Proposed WW treatment process | Aerobic: Extended Aeration Activated Sludge |
| Proposed location of WWTP | Proposed as approximately indicated in the Master Plan layout |
| Additional Remarks | |

# NAQOURA SCHEME
## Sub-scheme 2

<table>
<tr><td>Sub-scheme 2</td><td>South Lebanon Wastewater Master Plan – Naqoura Scheme<br>Sub-scheme 2 of 4</td></tr>
<tr><td>Number of localities served</td><td>11</td></tr>
<tr><td>Localities served</td><td>Chihine, Marouahine, Oun Toute, Zalloutiye, Boustane, Jijim, Tair Harfa, Matmoura, Dhaira, Yarine, Jebbain</td></tr>
<tr><td>Design population</td><td>2005 Population: 4,847<br>2030 Population Equivalent: 9,943</td></tr>
<tr><td>Daily Average Flow</td><td>16.21 l/s</td></tr>
<tr><td>Peak flow</td><td>60.78 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>15.89</td><td>300</td></tr>
<tr><td>Pipelines</td><td>1.24</td><td>400</td></tr>
<tr><td>Total Length</td><td>17.13</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>Sub-scheme 2:<br>24.23km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations have been proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>1,400m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# NAQOURA SCHEME
## Sub-scheme 3

<table>
<tr><td>Sub-scheme 3</td><td>South Lebanon Wastewater Master Plan – Naqoura Scheme<br>Sub-scheme 3 of 4</td></tr>
<tr><td>Number of localities served</td><td>3</td></tr>
<tr><td>Localities served</td><td>El Borj, Naqoura, Aalma ech Chaab</td></tr>
<tr><td>Design population</td><td>2005 Population: 3,882<br>2030 Population Equivalent: 8,258</td></tr>
<tr><td>Daily Average Flow</td><td>13.46 l/s</td></tr>
<tr><td>Peak flow</td><td>51.96 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>6.99</td><td>300</td></tr>
<tr><td>Total Length</td><td>6.99</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>Sub-scheme 3:<br>17.35 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations have been proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>1,163m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# NAQOURA SCHEME
## Sub-scheme 4

<table>
<tr><td>Sub-scheme 4</td><td>South Lebanon Wastewater Master Plan – Naqoura Scheme<br>Sub-scheme 4 of 4</td></tr>
<tr><td>Number of localities served</td><td>2</td></tr>
<tr><td>Localities served</td><td>Jbal el Botm, Zabqine</td></tr>
<tr><td>Design population</td><td>2005 Population: 2,398<br>2030 Population Equivalent: 5,103</td></tr>
<tr><td>Daily Average Flow</td><td>8.32 l/s</td></tr>
<tr><td>Peak flow</td><td>34.85 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>4.98</td><td>300</td></tr>
<tr><td>Total Length</td><td>4.98</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>Sub-scheme 4:<br>12 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations have been proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>719 m3/day</td></tr>
<tr><td>WW characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# JBAA SCHEME

<table>
<tr><td>WW05</td><td>South Lebanon Wastewater Master Plan – Jbaa Scheme</td></tr>
<tr><td>Number of localities served</td><td>13</td></tr>
<tr><td>Localities served</td><td>Zhalta, Mazraat Aain bou Souar, Jbaa, Kfarfila, Aain Qana, Jernaya, Kfarbeit, Kfarchellal</td></tr>
<tr><td>Previously studied by</td><td>ASSACO – 2006</td></tr>
<tr><td>Design population</td><td>2005 Population: 13,797<br>2030 Population Equivalent: 29,575</td></tr>
<tr><td>Daily Average Flow</td><td>48.21 l/s</td></tr>
<tr><td>Peak flow</td><td>150.41 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>12.96</td><td>200</td></tr>
<tr><td>Pipelines</td><td>11.48</td><td>300</td></tr>
<tr><td>Pipelines</td><td>3.67</td><td>400</td></tr>
<tr><td>Pipelines</td><td>1.56</td><td>450</td></tr>
<tr><td>Total Length</td><td>29.67</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>55.11 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by the previous Consultant or by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>4,165 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>Two small wastewater treatment plants implemented by USAID exist in Jbaa. One is constructed but not yet commissioned while the construction of the second is incomplete. One small operational but ineffective treatment plant also implemented by USAID exists in Kfar Fila.</td></tr>
</table>

## NABATIYEH SCHEME

<table>
<tr><td>WW06</td><td>South Lebanon Wastewater Master Plan – Nabatiyeh Scheme</td></tr>
<tr><td>Number of localities served</td><td>17</td></tr>
<tr><td>Localities served</td><td>Kfar Tebnit, Manzieh, El Aqide, Nabatiye El Faouqa, Kfar Roumane, Nabatiyeh Et Tahta, Mazraat Kfar El Jaouz, Habbouche, Zebdine, Harouf, Toul, Kfour, Doueir, Charqiye</td></tr>
<tr><td>Previously studied by</td><td>LibanConsult – year NA<br>BTD – 2002 (part of the scheme)<br>Khalil Barakat (part of the scheme)</td></tr>
<tr><td>Design population</td><td>2005 Population: 67,893<br>2030 Population Equivalent: 148,322</td></tr>
<tr><td>Daily Average Flow</td><td>292.20 l/s</td></tr>
<tr><td>Peak flow</td><td>698.00 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>Collectors proposed by both BTD and Khalil Barakat:
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>46.15</td><td>200</td></tr>
<tr><td>Pipelines</td><td>1.96</td><td>250</td></tr>
<tr><td>Pipelines</td><td>4.07</td><td>300</td></tr>
<tr><td>Pipelines</td><td>0.93</td><td>350</td></tr>
<tr><td>Pipelines</td><td>0.38</td><td>400</td></tr>
<tr><td>Pipelines</td><td>2.01</td><td>450</td></tr>
<tr><td>Pipelines</td><td>1.62</td><td>500</td></tr>
<tr><td>Pipelines</td><td>4.23</td><td>600</td></tr>
<tr><td>Pipelines</td><td>7.10</td><td>700</td></tr>
<tr><td>Pipelines</td><td>15.72</td><td>800</td></tr>
<tr><td>Total Length</td><td>84.17</td><td></td></tr>
</table></td></tr>
<tr><td>In-Locality Collection Network</td><td>235 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Items</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping/Lift Station at Ouadi Ech Chkhaib</td><td>1</td></tr>
</table></td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>25,246 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultants (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# NABAA EL TASSEH SCHEME

<table>
<tr><td>WW07</td><td>South Lebanon Wastewater Master Plan – Nabaa El Tasseh Scheme</td></tr>
<tr><td>Number of localities served</td><td>15</td></tr>
<tr><td>Localities served</td><td>Kfarhoune, Aaramta, Mlikh, El Louaize, Jarjouaa, Arab Salim, Habbouche, Houmine el Faouqa, Mazraat Aaraji</td></tr>
<tr><td>Previously studied by</td><td>Issal Saleh</td></tr>
<tr><td>Design population</td><td>2005 Population: 25,068<br>2030 Population Equivalent: 54,004 p.e. (RELK&P)</td></tr>
<tr><td>Daily Average Flow</td><td>88.03 l/s</td></tr>
<tr><td>Peak flow</td><td>249.11 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>15.22</td><td>200</td></tr>
<tr><td>Pipelines</td><td>7.90</td><td>250</td></tr>
<tr><td>Pipelines</td><td>3.78</td><td>300</td></tr>
<tr><td>Pipelines</td><td>2.00</td><td>400</td></tr>
<tr><td>Pipelines</td><td>11.64</td><td>500</td></tr>
<tr><td>Pipelines</td><td>4.77</td><td>600</td></tr>
<tr><td>Total Length</td><td>45.31</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>97.7km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by the previous Consultant or by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>7,603 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# CHAQRA SCHEME

<table>
<tr><td>WW08</td><td>South Lebanon Wastewater Master Plan – Chaqra Scheme</td></tr>
<tr><td>Number of localities served</td><td>14</td></tr>
<tr><td>Localities served</td><td>Maroun Er Ras, Bint Jbeil (10%), Aaitaroun, Beit Yahoun, Kounine, Mhaibib, Meiss El Jabal, Chaqra</td></tr>
<tr><td>Previously studied by</td><td>Libanconsult – 2005 (only a small part of the village of Chakra)</td></tr>
<tr><td>Design population</td><td>2005 Population: 33,092<br>2030 Population Equivalent: 71,335</td></tr>
<tr><td>Daily Average Flow</td><td>104.58 l/s</td></tr>
<tr><td>Peak flow</td><td>294.93 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>39.89</td><td>300</td></tr>
<tr><td>Pipelines</td><td>6.57</td><td>400</td></tr>
<tr><td>Pipelines</td><td>4.02</td><td>500</td></tr>
<tr><td>Pipelines</td><td>0.26</td><td>600</td></tr>
<tr><td>Total Length</td><td>50.74</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>94.4 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Items</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping/Lift Station at Chaqra</td><td>1</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>9,035 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

## TIBNINE SCHEME

<table>
<tr><td>WW09</td><td>South Lebanon Wastewater Master Plan – Tibnine Scheme</td></tr>
<tr><td>Number of localities served</td><td>7</td></tr>
<tr><td>Localities served</td><td>Baraachit, Jmaijmeh, Sultaniyeh, Safad El Battikh, Haddatha, Aaita Ez Zott, Tibnine</td></tr>
<tr><td>Previously studied by</td><td>Khalil Barakat<br>Libanconsult – 2005</td></tr>
<tr><td>Design population</td><td>2005 Population: 16,078<br>2030 Population Equivalent: 34,206</td></tr>
<tr><td>Daily Average Flow</td><td>55.76 l/s</td></tr>
<tr><td>Peak flow</td><td>170.06 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>Collectors proposed by both Khalil Barakat and Libanconsult:
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>7.97</td><td>200</td></tr>
<tr><td>Pipelines</td><td>16.62</td><td>250</td></tr>
<tr><td>Pipelines</td><td>11.13</td><td>300</td></tr>
<tr><td>Pipelines</td><td>2.85</td><td>350</td></tr>
<tr><td>Pipelines</td><td>5.46</td><td>500</td></tr>
<tr><td>Total Length</td><td>44.03</td><td></td></tr>
</table></td></tr>
<tr><td>In-Locality Collection Network</td><td>73 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Items</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping station at Braachit</td><td>1</td></tr>
<tr><td>2</td><td>Pumping station at Jmaijme</td><td>1</td></tr>
</table></td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>4,817 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultants (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>RELK&P adopted and combined the proposals by both Khalil Barakat and Libanconsult in it’s Master Plan</td></tr>
</table>

## BINT JBEIL SCHEME

<table>
<tr><td>WW10</td><td>South Lebanon Wastewater Master Plan – Bint Jbeil Scheme</td></tr>
<tr><td>Number of localities served</td><td>17</td></tr>
<tr><td>Localities served</td><td>Aain Ebel, Hanine, Yaroun, Bint Jbeil, Rmaich, Debel, Aaita Ech Chaab, Tiri, Rchaf, Srobbine, Yater, Beit Lif, Qouzah, Ramiye</td></tr>
<tr><td>Previously studied by</td><td>Liban Consult – 2005 (this study by Liban Consult covered only certain parts of the Bint Jbeil scheme proposed by RELK&P)</td></tr>
<tr><td>Design population</td><td>2005 Population: 36,157<br>2030 Population Equivalent: 77,389</td></tr>
<tr><td>Daily Average Flow</td><td>126.14 l/s</td></tr>
<tr><td>Peak flow</td><td>335.54 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>35.17</td><td>300</td></tr>
<tr><td>Pipelines</td><td>4.48</td><td>350</td></tr>
<tr><td>Pipelines</td><td>2.64</td><td>400</td></tr>
<tr><td>Pipelines</td><td>1.00</td><td>500</td></tr>
<tr><td>Pipelines</td><td>4.23</td><td>600</td></tr>
<tr><td>Pipelines</td><td>5.57</td><td>700</td></tr>
<tr><td>Total Length</td><td>53.09</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>144 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by the previous Consultant or by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>10,898 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# MARJAAYOUN SCHEME

<table>
<tr><td>WW11</td><td>South Lebanon Wastewater Master Plan – Marjaayoun Scheme</td></tr>
<tr><td>Number of localities served</td><td>10</td></tr>
<tr><td>Localities served</td><td>Blat, Dibbine, Marjaayoun, Ebel es Saqi, El Khiam, El Qlaiaa, Bourj el Moulouk</td></tr>
<tr><td>Previously studied by</td><td>BTD - 2004</td></tr>
<tr><td>Design population</td><td>2005 Population: 26,564<br>2030 Population Equivalent: 58,053</td></tr>
<tr><td>Daily Average Flow</td><td>94.63 l/s</td></tr>
<tr><td>Peak flow</td><td>264.01 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>10.40</td><td>200</td></tr>
<tr><td>Pipelines</td><td>19.15</td><td>250</td></tr>
<tr><td>Pipelines</td><td>20.82</td><td>300</td></tr>
<tr><td>Pipelines</td><td>5.32</td><td>400</td></tr>
<tr><td>Pipelines</td><td>10.30</td><td>500</td></tr>
<tr><td>Pipelines</td><td>0.57</td><td>600</td></tr>
<tr><td>Total Length</td><td>66.56</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>102.4 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Items</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping/Lift Station at Dibbine</td><td>1</td></tr>
<tr><td>2</td><td>Pumping/Lift Station at El Khiam</td><td>1</td></tr>
<tr><td>3</td><td>Pumping/Lift Station at Ebel es Saqi</td><td>1</td></tr>
<tr><td>4</td><td>Pumping/Lift Stations at Qlaiaa</td><td>2</td></tr>
<tr><td>5</td><td>Pumping/Lift Station west of Marj el Khiam</td><td>1</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>8,176 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout (in the Khiam plain)</td></tr>
<tr><td>Additional Remarks</td><td>Small rural wastewater treatment plants implemented by USAID exist in El Khiam and Bourj El Moulouk. At Khiam the plant is operational but not functioning properly. At Bourj el Moulouk there are two plants which have been constructed but not yet commissioned.</td></tr>
</table>

## JEZZINE SCHEME

<table>
<tr><td>WW12</td><td>South Lebanon Wastewater Master Plan – Jezzine Scheme</td></tr>
<tr><td>Number of localities served</td><td>24</td></tr>
<tr><td>Localities served</td><td>Aain Majdalaine, Jezzine, Ouadi Jezzine, Sabbah, Bkassine, Aaray, Bhannine, Deir Machmouche, Machmouche, Bteddine El Liqch, El Harf, El Midane, Benouati, El Ghbatiye</td></tr>
<tr><td>Previously studied by</td><td>No previous studies were conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 11,736<br>2030 Population Equivalent: 24,906</td></tr>
<tr><td>Daily Average Flow</td><td>40.60 l/s</td></tr>
<tr><td>Peak flow</td><td>130.31 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>22.55</td><td>300</td></tr>
<tr><td>Pipelines</td><td>1.86</td><td>350</td></tr>
<tr><td>Pipelines</td><td>2.03</td><td>400</td></tr>
<tr><td>Total Length</td><td>26.44</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>45.7 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Items</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping/Lift Station at Midane</td><td>1</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>3,508 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>There is one USAID funded treatment plant located in Ouadi Jezzine and one in El Ghbatiye. The plant in Ouadi Jezzine is operating properly whereas the one in El Ghbatiye has been constructed but not yet commissioned.</td></tr>
</table>

# MAIFADOUN/BRAIQAA SCHEME

<table>
<tr><td>WW13</td><td>South Lebanon Wastewater Master Plan – Maifadoun / Braiqaa scheme</td></tr>
<tr><td>Number of localities served</td><td>11</td></tr>
<tr><td>Localities served</td><td>Maifadoun, Choukine, Qaaqaiyet El Jisr, Jaouhariye, Aadchit, Qsaibe, Braiqeaa, Harouf (50%), Jibchit, Aabba</td></tr>
<tr><td>Previously studied by</td><td>No previous studies were conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 30,466<br>2030 Population Equivalent: 64,815</td></tr>
<tr><td>Daily Average Flow</td><td>105.65 l/s</td></tr>
<tr><td>Peak flow</td><td>289.48 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>13.54</td><td>300</td></tr>
<tr><td>Pipelines</td><td>2.46</td><td>350</td></tr>
<tr><td>Pipelines</td><td>11.36</td><td>400</td></tr>
<tr><td>Pipelines</td><td>3.69</td><td>500</td></tr>
<tr><td>Pipelines</td><td>1.17</td><td>600</td></tr>
<tr><td>Total Length</td><td>32.22</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>122.7 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>9,128 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# KFAR SIR SCHEME

<table>
<tr><td>WW14</td><td>South Lebanon Wastewater Master Plan - Kfar Sir Scheme<br>2 sub-schemes</td></tr>
<tr><td>Number of localities served</td><td>2</td></tr>
<tr><td>Localities served</td><td>Sir el Gharbiyeh and Kfar Sir</td></tr>
<tr><td>Previously studied by</td><td>Issal Saleh –Year NA</td></tr>
<tr><td>Design population</td><td>Sub-scheme 1:<br>2005 Population: 3,276<br>2030 Population Equivalent: 6,970<br><br>Sub-scheme 2:<br>2005 Population: 9,360<br>2030 Population Equivalent: 20,405</td></tr>
<tr><td>Daily Average Flow</td><td>Sub-scheme 1: 11 l/s<br>Sub-scheme 2: 33 l/s</td></tr>
<tr><td>Peak flow</td><td>Sub-scheme 1: 45 l/s<br>Sub-scheme 2: 110 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>Sub-scheme 1:
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>1.95</td><td>200</td></tr>
<tr><td>Total length</td><td>1.95</td><td></td></tr>
</table>
Sub-scheme 2:
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>3.88</td><td>200</td></tr>
<tr><td>Pipelines</td><td>0.06</td><td>300</td></tr>
<tr><td>Total length</td><td>3.94</td><td></td></tr>
</table>
Total length of collectors:
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>5.84</td><td>200</td></tr>
<tr><td>Pipelines</td><td>0.06</td><td>300</td></tr>
<tr><td>Grand total length</td><td>5.90</td><td></td></tr>
</table></td></tr>
<tr><td>In-Locality Collection Network</td><td>Sub-scheme 1: 13 km<br>Sub-scheme 2: 32.8 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by the previous Consultants or by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design Capacity</td><td>Sub-scheme 1: 950 m3/day<br>Sub-scheme 2: 2,851 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

## HALLOUSIEH SCHEME

<table>
<tr><td>WW15</td><td>South Lebanon Wastewater Master Plan – Hallousieh scheme</td></tr>
<tr><td>Number of localities served</td><td>4</td></tr>
<tr><td>Localities served</td><td>Hmairi, Tair Filsay, and Halloussiyeh</td></tr>
<tr><td>Previously studied by</td><td>Issal Saleh</td></tr>
<tr><td>Design population</td><td>2005 Population: 6,110<br>2030 Population Equivalent: 12,924</td></tr>
<tr><td>Daily Average Flow</td><td>21.07 l/s</td></tr>
<tr><td>Peak flow</td><td>75.63 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>6.22</td><td>200</td></tr>
<tr><td>Pipelines</td><td>0.15</td><td>250</td></tr>
<tr><td>Total Length</td><td>6.37</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>27.2 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by the previous Consultant or by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design Capacity</td><td>1,820 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by the previous Consultant (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

## SRIFA SCHEME

<table>
<tr><td>WW16</td><td>South Lebanon Wastewater Master Plan – Srifa scheme</td></tr>
<tr><td>Number of localities served</td><td>6</td></tr>
<tr><td>Localities served</td><td>Niha, Qalaat Maroun, Deir Kifa, Srifa, Bafliye</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 10,868<br>2030 Population Equivalent: 23,491</td></tr>
<tr><td>Daily Average Flow</td><td>38.29 l/s</td></tr>
<tr><td>Peak flow</td><td>124.44 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>8.62</td><td>300</td></tr>
<tr><td>Pipelines</td><td>0.25</td><td>400</td></tr>
<tr><td>Total Length</td><td>8.87</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>44 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design Capacity</td><td>3,308 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# WADI SLOUQI SCHEME

<table>
<tr><td>WW17</td><td colspan="2">South Lebanon Wastewater Master Plan – Wadi Slouqi Scheme</td></tr>
<tr><td>Number of localities served</td><td colspan="2">19</td></tr>
<tr><td>Localities served</td><td colspan="2">Majdel Selm, Jmaijme, Khirbet Selm, Markaba, Aadaiseh, Taibeh, Souane, Tallousa, Aadshit el Qsair, Qantara, Touline, Bourj Qalaouiyeh, Ghandouriyeh, El Qsair, Froun, Houla, Qalaouay, Bani Hayane, Qabrikha</td></tr>
<tr><td>Previously studied by</td><td colspan="2">No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td colspan="2">2005 Population: 41,970<br>2030 Population Equivalent: 89,814</td></tr>
<tr><td>Daily Average Flow</td><td colspan="2">176.93 l/s</td></tr>
<tr><td>Peak flow</td><td colspan="2">406.95 l/s</td></tr>
<tr><td colspan="3">Network</td></tr>
<tr><td>Main Collectors</td><td colspan="2"><table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>65.24</td><td>300</td></tr>
<tr><td>Pipelines</td><td>3.89</td><td>400</td></tr>
<tr><td>Pipelines</td><td>3.99</td><td>450</td></tr>
<tr><td>Pipelines</td><td>4.16</td><td>500</td></tr>
<tr><td>Pipelines</td><td>2.73</td><td>600</td></tr>
<tr><td>Pipelines</td><td>0.48</td><td>700</td></tr>
<tr><td>Total Length</td><td>80.49</td><td></td></tr>
</table></td></tr>
<tr><td>In-Locality Collection Network</td><td colspan="2">176 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td colspan="2">No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="3">Treatment</td></tr>
<tr><td>Design capacity</td><td colspan="2">15,293 m3/day</td></tr>
<tr><td>WW Characterization</td><td colspan="2">Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td colspan="2">Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td colspan="2">Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td colspan="2"></td></tr>
</table>

## YOHMOR SCHEME

<table>
<tr><td>WW18</td><td>South Lebanon Wastewater Master Plan – Yohmor Scheme</td></tr>
<tr><td>Number of localities served</td><td>1</td></tr>
<tr><td>Localities served</td><td>Yohmor village</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 2,340<br>2030 Population Equivalent: 4,978</td></tr>
<tr><td>Daily Average Flow</td><td>8.11 l/s</td></tr>
<tr><td>Peak flow</td><td>34.08 l./s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>2.34</td><td>300</td></tr>
<tr><td>Total Length</td><td>2.34</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>9.4 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>701 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

# ZAOUTAR SCHEME

<table>
<tr><td>WW19</td><td>South Lebanon Wastewater Master Plan – Zaoutar Scheme</td></tr>
<tr><td>Number of localities served</td><td>2</td></tr>
<tr><td>Localities served</td><td>Zaoutar Charquiye & Zaoutar Gharbiyeh</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 1,189<br>2030 Population Equivalent: 2,529</td></tr>
<tr><td>Daily Average Flow</td><td>4.12 l/s</td></tr>
<tr><td>Peak flow</td><td>22.67 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>1.91</td><td>200</td></tr>
<tr><td>Total Length</td><td>1.91</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>5.9 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>
<table>
<tr><th>Description</th><th>Quantity</th></tr>
<tr><td>Pumping station at Zaoutar Ech Charquiye</td><td>1</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>356 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

## DEIR MIMMES SCHEME

<table>
<tr><td>WW20</td><td>South Lebanon Wastewater Master Plan – Deir Mimmes Scheme</td></tr>
<tr><td>Number of localities served</td><td>3</td></tr>
<tr><td>Localities served</td><td>Kfarkila, Houla, and Deir Mimes</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 6,525<br>2030 Population Equivalent: 13,882</td></tr>
<tr><td>Daily Average Flow</td><td>22.63 l/s</td></tr>
<tr><td>Peak flow</td><td>80.10 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>3.85</td><td>200</td></tr>
<tr><td>Pipelines</td><td>2.69</td><td>300</td></tr>
<tr><td>Pipelines</td><td>0.35</td><td>400</td></tr>
<tr><td>Total Length</td><td>6.89</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>27.7 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>1,955 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>A small rural operational wastewater treatment plant implemented by USAID exists in Deir Mimes.</td></tr>
</table>

# EL AACHIYEH SCHEME

<table>
<tr><td>WW21</td><td>South Lebanon Wastewater Master Plan – El Aachiyeh Scheme</td></tr>
<tr><td>Number of localities served</td><td>3</td></tr>
<tr><td>Localities served</td><td>El Aaichiye & Nabaa and Dellafa which are the suburbs of El Aachiyeh village</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 814<br>2030 Population Equivalent: 1,670</td></tr>
<tr><td>Daily Average Flow</td><td>2.72 l/s</td></tr>
<tr><td>Peak flow</td><td>14.97 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>2.15</td><td>200</td></tr>
<tr><td>Total Length</td><td>2.15</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>4.1 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>235 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>A wastewater treatment plant implemented by USAID exists in El Aachiyeh and it is operating properly. This area is served by the existing USAID treatment plant up until the year 2015. The Consultant team, after investigating the treatment plant site, recommended expansion of this treatment plant site to provide service up until the year 2030.</td></tr>
</table>

# KAFRA SCHEME

<table>
<tr><td>WW22</td><td>South Lebanon Wastewater Master Plan – Kafra Scheme</td></tr>
<tr><td>Number of localities served</td><td>2</td></tr>
<tr><td>Localities served</td><td>Kafra and Haris</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 7,668<br>2030 Population Equivalent: 16,314</td></tr>
<tr><td>Daily Average Flow</td><td>26.59 l/s</td></tr>
<tr><td>Peak flow</td><td>91.74 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>2.52</td><td>200</td></tr>
<tr><td>Pipelines</td><td>1.74</td><td>250</td></tr>
<tr><td>Pipelines</td><td>0.26</td><td>300</td></tr>
<tr><td>Total Length</td><td>4.52</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>31 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>2,297 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

## RIHANE SCHEME

<table>
<tr><td>WW23</td><td>South Lebanon Wastewater Master Plan – Rihane Scheme</td></tr>
<tr><td>Number of localities served</td><td>3</td></tr>
<tr><td>Localities served</td><td>Soujoud and Rihane</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted.</td></tr>
<tr><td>Design population</td><td>2005 Population: 3,328<br>2030 Population Equivalent: 7,081</td></tr>
<tr><td>Daily Average Flow</td><td>11.54 l/s</td></tr>
<tr><td>Peak flow</td><td>45.82 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>4.15</td><td>200</td></tr>
<tr><td>Pipelines</td><td>0.23</td><td>250</td></tr>
<tr><td>Total Length</td><td>4.38</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>14.5 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>997 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>A small rural wastewater treatment plant has been implemented by USAID in Rihane. This treatment plant has been rehabilitated to adopt extended aeration technology. However said plant has not yet been connected to the network.</td></tr>
</table>

## MIMESS SCHEME

<table>
<tr><td>WW24</td><td>South Lebanon Wastewater Master Plan – Mimess Scheme</td></tr>
<tr><td>Number of localities served</td><td>5</td></tr>
<tr><td>Localities served</td><td>Kfair, Khalouat El Kfair, Mimess, Bathaniyeh</td></tr>
<tr><td>Previously studied by</td><td>Camp Dresser and McKee (CDM) 1982</td></tr>
<tr><td>Design population</td><td>2005 Population: 4,120<br>2030 Population Equivalent: 8,765</td></tr>
<tr><td>Daily Average Flow</td><td>14.29 l/s</td></tr>
<tr><td>Peak flow</td><td>50.43 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>12.33</td><td>200</td></tr>
<tr><td>Pipelines</td><td>5.15</td><td>300</td></tr>
<tr><td>Total Length</td><td>17.48</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>20.60 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by the previous Consultant or RELK&P at this stage of study</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>1,235 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>Two wastewater treatment plants implemented by USAID exist in Mimess and one also implemented by USAID exists in Kfair. In Mimess both plants are ready for operation but have not yet been commissioned. In Kfair the plant is ready for operation but has not yet been commissioned.</td></tr>
</table>

## HASBAYA SCHEME

<table>
<tr><td>WW25</td><td>South Lebanon Wastewater Master Plan – Hasbaya Scheme</td></tr>
<tr><td>Number of localities served</td><td>5</td></tr>
<tr><td>Localities served</td><td>Hasbaya, Mazraat Ras El Baidar, Chouaya, Zaghla, Ain Qenia</td></tr>
<tr><td>Previously studied by</td><td>Rafik El-Khoury & Partners – 2006</td></tr>
<tr><td>Design population</td><td>2005 Population: 10,290<br>2030 Population Equivalent: 22,333</td></tr>
<tr><td>Daily Average Flow</td><td>42.63 l/s</td></tr>
<tr><td>Peak flow</td><td>139.40 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>Hasbaya project sewer network details:
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines in roads</td><td>13.60</td><td>300</td></tr>
<tr><td>Pipelines in roads</td><td>3.95</td><td>400</td></tr>
<tr><td>Pipelines in roads</td><td>1.40</td><td>500</td></tr>
<tr><td>Pipelines in natural grounds – river course</td><td>2.10</td><td>400</td></tr>
<tr><td>TOTAL LENGTH</td><td>21.05</td><td></td></tr>
</table></td></tr>
<tr><td>In-Locality Collection Network</td><td>38.85 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>A small-sized pumping station has been proposed for pumping the sewage resulting from the southeastern part of Chouwaya village
<table>
<tr><th>Items</th><th>Description</th><th>Quantity</th></tr>
<tr><td>1</td><td>Pumping station at Chouwaya</td><td>1</td></tr>
</table></td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>3,683 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Grab water samples were taken at points where municipal WW is mixed with WW resulting from local olive oil mills from villages in the Caza of Hasbaya. The WW was found to have the following characteristics:<br>$BOD_5$ 825 mg/l<br>TSS 750 mg/l</td></tr>
<tr><td>Proposed WW treatment process</td><td>Secondary biological treatment through suspended growth process (Extended Aeration Activated Sludge) with chlorine disinfection.<br>Sludge treatment: sludge dewatering</td></tr>
<tr><td>Proposed location of WWTP</td><td>The WWTP is proposed to be built on the left bank of the Hasbani River on a privately owned parcel. Plot Numbers: 4307, 4308, 4309 with a total surface area equal to 12,310$m^2$ (refer to map).</td></tr>
<tr><td>Additional Remarks</td><td>Small rural wastewater treatment plants have been implemented by USAID in Hasbaya, Ain Qenia and Chouaya. There are two plants in Hasbaya, one of which has been rehabilitated and upgraded to extended aeration while construction of the second plant has been completed. There are three plants in Ain Qenia which are operational. In Chouaya a new plant has recently been constructed.</td></tr>
</table>

## HEBBARIYEH SCHEME

<table>
<tr><td>WW26</td><td>South Lebanon Wastewater Master Plan – Hebbariyeh Scheme</td></tr>
<tr><td>Number of localities served</td><td>4</td></tr>
<tr><td>Localities served</td><td>Ain Jerfa, Khalouat el Baiyada, Hebbariye, Fardis</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted</td></tr>
<tr><td>Design population</td><td>2005 Population: 3,793<br>2030 Population Equivalent: 8,007</td></tr>
<tr><td>Daily Average Flow</td><td>13.05 l/s</td></tr>
<tr><td>Peak flow</td><td>50.63 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>5.92</td><td>200</td></tr>
<tr><td>Pipelines</td><td>0.36</td><td>300</td></tr>
<tr><td>Total Length</td><td>6.28</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>18.97 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>1,127 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>Small rural wastewater treatment plants implemented by USAID exist in Hebbariyeh, Ain Jerfa and Fardis. At Ain Jerfa there is one treatment plant which is operational. At Hebbariyeh a new plant has recently been constructed. At Fardis a new plant has also recently been constructed.</td></tr>
</table>

## KAOUKABA SCHEME

<table>
<tr><td>WW27</td><td>South Lebanon Wastewater Master Plan – Kaoukaba Scheme</td></tr>
<tr><td>Number of localities served</td><td>1</td></tr>
<tr><td>Localities served</td><td>Kaoukaba village</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted</td></tr>
<tr><td>Design population</td><td>2005 Population: 953<br>2030 Population Equivalent: 1955</td></tr>
<tr><td>Daily Average Flow</td><td>3.19 l/s</td></tr>
<tr><td>Peak flow</td><td>15.68 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>1.59</td><td>200</td></tr>
<tr><td>Total Length</td><td>1.59</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>4.77 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>276 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>A small new rural wastewater treatment plant implemented by USAID has recently been constructed in Kaoukaba.</td></tr>
</table>

# RACHAYA EL FOUKHAR SCHEME

<table>
<tr><td>WW28</td><td>South Lebanon Wastewater Master Plan – Rachaya El Foukhar Scheme</td></tr>
<tr><td>Number of localities served</td><td>2</td></tr>
<tr><td>Localities served</td><td>Rachaya el Foukhar, Kfar Hamam</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted</td></tr>
<tr><td>Design population</td><td>2005 Population: 1,827<br>2030 Population Equivalent: 3,748</td></tr>
<tr><td>Daily Average Flow</td><td>6.11 l/s</td></tr>
<tr><td>Peak flow</td><td>27.01 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>4.73</td><td>200</td></tr>
<tr><td>Total Length</td><td>4.73</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>9.14 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>528 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>A small rural wastewater treatment plant implemented by USAID has recently been constructed in Kfar Hamam</td></tr>
</table>

## KFARCHOUBA SCHEME

<table>
<tr><td>WW29</td><td>South Lebanon Wastewater Master Plan – Kfarchouba Scheme</td></tr>
<tr><td>Number of localities served</td><td>1</td></tr>
<tr><td>Localities served</td><td>Kfarchouba village</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted</td></tr>
<tr><td>Design population</td><td>2005 Population: 2,604<br>2030 Population Equivalent: 5,540</td></tr>
<tr><td>Daily Average Flow</td><td>9.03 l/s</td></tr>
<tr><td>Peak flow</td><td>37.29 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>2.03</td><td>200</td></tr>
<tr><td>Total Length</td><td>2.03</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>10.42 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>781 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td></td></tr>
</table>

## EL MERI SCHEME

<table>
<tr><td>WW30</td><td>South Lebanon Wastewater Master Plan – El Mari Scheme</td></tr>
<tr><td>Number of localities served</td><td>1</td></tr>
<tr><td>Localities served</td><td>El Mari village</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted</td></tr>
<tr><td>Design population</td><td>2005 Population: 1,067<br>2030 Population Equivalent: 2,270</td></tr>
<tr><td>Daily Average Flow</td><td>3.70 l/s</td></tr>
<tr><td>Peak flow</td><td>17.76 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>0.97</td><td>200</td></tr>
<tr><td>Total Length</td><td>0.97</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>5.34 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>320 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>A small rural wastewater treatment plant implemented by USAID has recently been constructed in El Meri.</td></tr>
</table>

# EL WAZZANI SCHEME

<table>
<tr><td>WW31</td><td>South Lebanon Wastewater Master Plan – El Wazzani Scheme</td></tr>
<tr><td>Number of localities served</td><td>1</td></tr>
<tr><td>Localities served</td><td>El Wazzani village</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted</td></tr>
<tr><td>Design population</td><td>2005 Population: 194<br>2030 Population Equivalent: 397</td></tr>
<tr><td>Daily Average Flow</td><td>1 l/s</td></tr>
<tr><td>Peak flow</td><td>4 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>0.45</td><td>200</td></tr>
<tr><td>Total Length</td><td>0.45</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>0.37 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>86.4 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>A small rural wastewater treatment plant has been implemented by USAID in El Wazzani and this plant is operational.</td></tr>
</table>

## CHEBAA SCHEME

<table>
<tr><td>WW32</td><td>South Lebanon Wastewater Master Plan – Chebaa Scheme</td></tr>
<tr><td>Number of localities served</td><td>1</td></tr>
<tr><td>Localities served</td><td>Chebaa village</td></tr>
<tr><td>Previously studied by</td><td>No studies were previously conducted</td></tr>
<tr><td>Design population</td><td>2005 Population: 10,080<br>2030 Population Equivalent: 22,516</td></tr>
<tr><td>Daily Average Flow</td><td>44.36 l/s</td></tr>
<tr><td>Peak flow</td><td>145.49 l/s</td></tr>
<tr><td colspan="2">Network</td></tr>
<tr><td>Main Collectors</td><td>
<table>
<tr><th>Collectors</th><th>Length (km)</th><th>Diameter (mm)</th></tr>
<tr><td>Pipelines</td><td>2.47</td><td>400</td></tr>
<tr><td>Total Length</td><td>2.47</td><td></td></tr>
</table>
</td></tr>
<tr><td>In-Locality Collection Network</td><td>35.28 km</td></tr>
<tr><td>Pumping/Lift Station (s)</td><td>No pumping stations were proposed by RELK&P at this stage of study.</td></tr>
<tr><td colspan="2">Treatment</td></tr>
<tr><td>Design capacity</td><td>3,833 m3/day</td></tr>
<tr><td>WW Characterization</td><td>Wastewater characterization was not carried out by at this stage of study (refer to general notes).</td></tr>
<tr><td>Proposed WW treatment process</td><td>Aerobic: Extended Aeration Activated Sludge</td></tr>
<tr><td>Proposed location of WWTP</td><td>Proposed as approximately indicated in the Master Plan layout</td></tr>
<tr><td>Additional Remarks</td><td>One wastewater treatment plant implemented by USAID exists in Chebaa and construction of said plant has been completed. The Municipality needs to separate the storm water from the sewer network.</td></tr>
</table>