Gaza Solid Waste Management Project

Addendum No.1 to the GSWMP Environmental & Social Impact Assessment

Environmental and Social Management Plan
For Rafah Solid Waste Transfer Station

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ESMP for the Proposed
Solid Waste Transfer Station Design By
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CMWU	Coastal Municipal Water Utilities
EFS	Environmental Friends Society
EPA	Environmental Protection Agency
EQA	Environmental Quality Agency
ESMP	Environmental and Social Management Plan
FS	Feasibility Study
GSWMP	Gaza Solid Waste Management Plan
HH	House Hold
JSC-KRM	Joint Service Council – Khan Younis, Rafah and Middle area
MDLF-PDSU	Municipal Development and Lending Fund- Project Development and Safeguards Unit
MOLG	Ministry of Local Governorate
MSW	Municipal Solid Waste
NO_x	Nitrogen Oxides
PCBS	Palestinian Central Bureau of Statistics
PEL	Environmental Law of Palestine
TS	Transfer Station
SWM	Solid Waste Management
UNRWA	United Nations Refugee Work Agency
WHO	World Health Organization
WWTP	Wastewater Treatment Plant

الملخص التنفيذي

إن صندوق تطوير وإقراض البلديات هي الجهة المخولة لتنفيذ مشروع إدارة النفايات الصلبة في قطاع غزة والذي يهدف إلى تحسين خدمات إدارة النفايات الصلبة في قطاع غزة. من خلال مشروع إدارة النفايات الصلبة في قطاع غزة، يتم الان بناء مكب نفايات صحي جنوبي قطاع غزة (مكب نفايات الفخاري)، والذي سيتم إدارته بمعايير ذات مستوى عالي، كما سيتم ربط مكب نفايات الفخاري بثلاث محطات ترحيل نفايات صلبة في محافظات جنوب قطاع غزة، والتي سيكون إحداها محطة ترحيل النفايات في رفح.

يهدف هذا التقرير إلى تقديم خطة إدارة بيئية وإجتماعية لمحطة ترحيل النفايات في رفح في مرحلتي الإنشاء والتشغيل، ويحتوي التقرير على قاعدة البيانات الأساسية (Baseline Data) بالإضافة إلى الأثار المتوقعة من المشروع (Expected Impacts) و كذلك الإجراءات التخفيفية المقترحة (Mitigation Measures) وأخيرا خطة الرقابة والمتابعة (Monitoring Measures) خلال فترة إنشاء وتشغيل المحطة.

تقع محطة ترحيل النفايات في رفح بجانب محطة فرز النفايات والتي يتم إدارتها من قبل مؤسسة محلية جنوب مدينة رفح، بالإضافة لمحاذاتها لمحطة معالجة المياه العادمة في المدينة، وتبلغ مساحة محطة الترحيل 6000 م^2. وقد قام صندوق تطوير وإقراض البلديات بتكليف شركة إستشارية لتصميم محطات الترحيل الثلاثة في جنوب قطاع غزة، وقد وضح التصميم الإبتدائي لمحطة ترحيل رفح كيفية عمل المحطة والعمليات التقنية الداخلية التي تجري بداخلها، علما بأنه تم إعتماد نوع محطة الترحيل (Direct Load) بناء على رأي الإستشاري وهو أن يتم تفريغ النفايات من الشاحنات الصغيرة مباشرة من مستوى مرتفع إلى حاويات الرمثا الكبيرة التي تقع في مستوى منخفض، حيث يتم نقل حاويات الرمثا عند إمتلائها إلى مكب النفايات. ويحتوي تصميم المحطة على عناصر رئيسية وهي منطقة مصف الشاحنات، ومحطة غسل الشاحنات، معرش أعلى منطقة العمل وأماكن تجميع النفايات، قاعة خاصة بالعمال مع توابعها، ميزان النفايات، مبنى إداري، مولد كهربائي و خوان للوقود، و محطة ضخ المياه. وقام الإستشاري بدراسة الحركة المرورية لشاحنات النفايات وكارات جمع النفايات من وإلى المحطة عبر برنامج حاسوبي متخصص، والتي اقترحت مسارات للشاحنات الداخلة ومسارات للشاحنات الخارجة من المحطة والتي بموجبها ستصبح الحركة المرورية سلسة. علاوة على ذلك، يعتمد تصميم محطة الترحيل على نظام جمع منفصل للعصارة الناتجة عن النفايات وذلك عبر شبكة تجميع للعصارة عن طريق السريان بالجاذبية تنتهي بخزان معزول بحجم 5 م^3، كما سيتم تجميع مياه الأمطار بشكل منفصل ليتم الإستفادة منها في الري حول المحطة، ومنعا من وصولها إلى مناطق العمل أو خزان العصارة، وبالإضافة إلى ذلك، هناك شبكة منفصلة لتجميع المياه العادمة والتي تتصل مباشرة بشبكة المياه العادمة في المدينة. وتم إعتماد شريط من الأشجار على طول المحطة وبعكس اتجاه الرياح لتقليل أي أثار بيئية ناتجة عن المحطة.

تنقسم قاعدة البيانات الأساسية إلى ثلاث أقسام رئيسية وهي:

- **البيئة الفيزيائية:** وتحتوي على وصف لطبغرافية وجيولوجية الأرض، المسحات المائية، الضوضاء، الرائحة، الإنبعاثات الجوية، جودة الهواء و جودة مياه الخزان الجوفي.
- **البيئة البيولوجية:** وتحتوي على وصف مواطن الحيوانات والنباتات في المنطقة.
- **القضايا الإجتماعية والإقتصادية:** وتحتوي على وصف للوضع الإقتصادي في المنطقة، و عدد السكان ونسب ومؤشرات زيادتهم، و كميات إنتاج النفايات في المنطقة ومحتويات النفايات، الصحة العامة للمجتمع، وكذلك عمليات جمع ونقل النفايات.

وقد تم إجراء إستبيانات للسكان المحليين، حيث تم إستهداف حوالي 100 عائلة من المجتمع المحلي القريب من محطة الترحيل، وكذلك زيارات لمحطة الترحيل، كما تم عقد ورشة عمل بتاريخ 17/نوفمبر/2017 مع الشركاء والمهتمين وذوي العلاقة بما فيهم صندوق تطوير البلديات و مجلس الخدمات المشترك، وبلدية رفح، ووكالة الغوث، وسلطة جودة البيئة، ومؤسسات محلية، وممثلي عن المجتمع المحلي، وممثلي عن وزارة الحكم المحلي. وقد نتج عن النقاش خلال ورشة العمل مع ذوي العلاقة من جهات مختلفة تعريف لأهم الأثار المتوقعة من إنشاء وتشغيل محطة ترحيل النفايات في رفح، وكذلك إقتراح أنسب الإجراءات التخفيفية التي بدورها ستقلل من حجم الأثر البيئي.

إن قاعدة البيانات المتوفرة وبالإضافة لما تم استخلاصه من الإستبيان يتطابق بشكل كبير مع ما تم ذكره في دراسة تقييم الأثر البيئي والإجتماعي لمشروع إدارة النفايات الصلبة في قطاع غزة عام 2012، وقد تم تحديث بعض البيانات من مصادر أخرى مثل مصلحة مياه بلديات الساحل، وبلدية رفح فيما يتعلق بجودة المياه الجوفية و أماكن أبار المياه البلدية. كما تم الإعتماد على دراسات حديثة أخرى في تحديث البيانت المتعلقة بجودة الهواء، مع العلم بأن هذه الدراسة لم تقم بإجراء أي فحوصات للمياه أو الهواء أو التربة. البيانات الأساسية اللازمة لإستكمال الدراسة متوفرة بشكل عام و هي بجودة مقبولة.

وقد تم خلال الدراسة توقع مجموعة الأثار البيئية التي قد تنجم عن **إنشاء محطة ترحيل النفايات** في رفح والتي قد تكون إيجابية أو سلبية وممكن إجمالها كالتالي:

- **التربة:** من الممكن أن تتلوث التربة من الأعمال اليومية خلال فترة الإنشاء.
- **جودة الهواء:** من الممكن أن تتغير جودة الهواء بفعل عمل أليات الحفر في الموقع.
- **الضوضاء:** من المتوقع أن ينتج تلوث ضوضائي نتيجة أعمال الإنشاء، وكذلك حركة شاحنات الحفر.
- **مواطن النباتات والحيوانات**: تم ملاحظة حديقة تتبع لبلدية رفح بمحاذاة موقع محطة الترحيل والتي يجب ان يتم حمايتها عند إنشاء المحطة.
- **الصحة والسلامة المهنية للعمال:** وقد يتضمن هذا الأثر الخطر الفيزيائي من سقوط العمال من أعلى أو إصابتهم وجروحهم، وكذلك الخطر من حركة أليات النفايات الثقيلة.
- **المجتمع المحلي:** من المتوقع أن ينتج عدم رضى من السكان والمزارعين بسبب الضوضاء و الأغبرة ...إلخ.
- **خلق فرص عمل:** من المتوقع ان يتم خلق 60 فرصة عمل خلال فترة إنشاء محطة ترحيل النفايات في رفح.

وقد تم خلال الدراسة توقع مجموعة الأثار البيئية التي قد تنجم عن **تشغيل محطة ترحيل النفايات** في رفح والتي قد تكون إيجابية أو سلبية وممكن إجمالها كالتالي:

- **عملية إدارة النفايات الصلبة:** من المتوقع أن يكون للمحطة الجديدة أثر إيجابي على إدارة النفايات الصلبة، وذلك من خلال تسهيل عمليات إدارة النفايات في مدينة رفح بتكاليف أقل و أثار بيئية أقل بالمقارنة مع الوضع السابق.
- **الخوان الجوفي والتربة:** من الممكن أن يتلوث الخوان الجوفي أو التربة من العصارة المتجمعة.
- **جودة الهواء:** من الممكن أن تتغير جودة الهواء بفعل حركة شاحنات النفايات على الطرق الغير معبدة وخلال عمليات تحميل وتفريغ النفايات.
- **الضوضاء:** من المتوقع أن ينتج تلوث ضوضائي نتيجة تشغيل المحطة، وكذلك حركة شاحنات نقل النفايات.
- **مواطن النباتات والحيوانات**: تم ملاحظة حديقة تتبع لبلدية رفح بمحاذاة موقع محطة الترحيل والتي يجب ان يتم حمايتها عند تشغيل المحطة.
- **المواصلات وحركة المرور:** من المتوقع أن ينتج تأثير سلبي أو تشويش على حركة المرور على الطرق الرئيسية والذي قد يؤدي لارتفاع نسب الحوادث المرورية، وزيادة خفيفة للإزدحام المروري بسبب مرور شاحنات جمع ونقل النفايات وتطاير بعض من محتوياتها على الشوارع.
- **صحة المجتمع المحلي:** من المتوقع أن يكون هناك أثر إيجابي لإنشاء المحطة على صحة الناس كونها ستكون بديل عن نقاط تجميع نفايات عشوائية، ومن المتوقع أيضا أن ينتج أثرسلبي على صحة السكان والمزارعين، وهذا التأثير قد يكون بسبب الأغبرة المتصاعدة بسبب حركة شاحنات النفايات الثقيلة أو انتشار الحشرات والقوارض في المنطقة.
- **الصحة والسلامة المهنية للعمال:** وقد يتضمن هذا الأثر الخطر الفيزيائي من سقوط العمال من أعلى أو إصابتهم وجروحهم، وكذلك الخطر من حركة أليات النفايات الثقيلة، وخطر تعامل العمال المباشر مع النفايات.

يحتوي هذا التقرير أيضا على خطة إدارة ومراقبة بيئية وإجتماعية للمحطة أثناء فترات الإنشاء والتشغيل، وقد تم صياغة الخطة بعد عقد عدة زيارات لموقع المحطة، و مراجعة البيانات البيئية والإجتماعية المتوفرة حول طبيعة الموقع، وكذلك بعد عقد لقاءات مع صندوق تطوير وإقراض البلديات، و عقد ورشة عمل لذوي العلاقة و كذلك إستبيان للمجتمع المحلي. ويمكن إيجاز الإجراءات التخفيفية التي تم إقتراحها كالتالي:

- **المياه السطحية والجوفية:** يجب تركيب نظام جمع للعصارة الناتجة عن النفايات وذلك لتجنب تلويث المياه السطحية او الجوفية، كما يجب ان يتم نقل النفايات بشكل يومي من محطة الترحيل إلى مكب النفايات.
- **جودة الهواء:** يجب رش المياه خلال فترات العمل وذلك لتقليل الأغبرة، ويجب التحكم في سرعة شاحنات نقل النفايات، وإختيار مسارات مثلى لها لتقليل أثار الأغبرة التي قد تنتج.
- **الضوضاء:** يجب ان يتم تشغيل الشاحنات والألات بشكل أمثل بحيث يتم جدولة مواعيد تشغيلها و ذلك لتقليل الضوضاء الناتج عنها، وكذلك يجب وضع حواجز صوتية في حال تم تلقي شكاوي متعلقة بالضوضاء.

- **المواصلات والحركة المرورية:** يجب على شاحنات النفايات ألا تعمل خلال فترة ساعة الذروة، و يجب وضع رقابة محكمة على أي حوادث تحدث ويتم تسجيلها وأرشفتها، وعقد استبيانات دورية حول حركة شاحنات النفايات.
- **صحة المجتمع المحلي:** يجب إبلاغ السكان المحليين بمواعيد عمل المحطة والخطط الإدارية لها، ويجب عزل مناطق العمل وتحديدها، وتطبيق إجراءات السلامة لحماية السكان من الإصابات وحماية الممتلكات المحاذية من الضرر.
- **الصحة والسلامة المهنية للعمال:** يجب على العمال إتباع الإرشادات وإتباع إجراءات السلامة والأمان، وكذلك الإستحمام كلما لزم الأمر. يجب على العمال الإلتزام بلبس ملابس الوقاية مثل سماعات الأذن الواقية، القبعات الواقية، الفيستات ذات اللون المميز، وغيرها من أدوات الحماية والتي تحمي العامل من التعرض للإصابة أو الضرر، كما يجب أن يتوفر صناديق الإسعاف الأولي في موقع العمل مع أشخاص مدربين على اجراء الإسعافات الأولية، وأخيرا يجب وضع خطط واضحة للانسحاب من الموقع في حالات الطوارئ.

إن خطة الإدارة البيئية التي تم إقتراحها اشتملت بشكل واضح على تعريف للإجراءات التخفيفية المطلوبة والجهات المسئولة عن تنفيذ كل منها، كما اشتملت على طريقة مراقبة ورصد تنفيذ الإجراءات التخفيفية و الجهات المسئولة عن إجراء المراقبة وكذلك عدد مرات المراقبة. إن مسئولية شركة المقاولات أن تقوم بكافة الإجراءات التخفيفية خلال فترة إنشاء المحطة، بينما على صندوق تطوير وإقراض البلديات و مجلس الخدمات المشترك أن تراقب مدى إمتثال شركة المقاولات للإجراءات المطلوبة بشكل دوري. أما فيما يتعلق بمرحلة تشغيل المحطة، فإن مسئولية إجراء الوسائل التخفيفية تقع على عاتق مجلس الخدمات المشترك بالشراكة مع الشركاء المحليين مثل بلدية رفح، بينما تقوم سلطة جودة البيئة و صندوق تطوير وإقراض البلديات بمراقبة تنفيذ هذه الإجراءات، كما سيكون هناك نظام تلقي شكاوي من المواطنين لتلقي أي شكاوي خلال فترات بناء أو تشغيل المحطة.

EXCUTIVE SUMMARY

The Municipal Development & Lending Fund (MDLF) is the delegated implementation agency for Gaza Solid Waste Management Project (GSWMP), which aims at improving the solid waste services in Gaza Strip. Through the GSWMP, a sanitary landfill is currently constructed in the southern region of Gaza Strip (Rafah). The new facility will be equipped to operate at high standard and it will be complemented by a system of three solid waste transfer stations in southern part of Gaza Strip, one of which in Rafah governorate funded within this project.

This report presents Environmental and Social Management Plan (ESMP) for the Rafah Transfer Station, which includes the baseline data, expected impacts, and the proposed mitigation and monitoring measures during the construction and operation phases of the Project. This site specific ESMP is an addendum to the ESIA of the GSWMP cleared in 2012.

The proposed site is near an existing sorting facility operated by a local NGO and located to southern part of the city near the WWTP with a total area of about 6,000 m^2. Local consultant has been hired by MDLF to prepare full design of the transfer station. The prepared conceptual design provides a description of the proposed system in terms of a set of integrated concepts about what it should do, behave, and look like to serve Rafah governorate. The planned Transfer Station Type is Direct Load which the waste discharged directly into an open top roll on/off trailer. The waste will be directly tipped into trailer in different elevations. The main components and design elements of planned Rafah transfer station include parking areas, truck washing station, roofing and cover including roof structure over drop off points and/or materials, and cover over and around waste storage points, utilities and staff facilities, scale house, administration building, worker building, electric generator, fuel storage structure, and water supply pumping station. The planned design considered a smooth and flexible movement through using a computerized model showing the best routes for internal circulation and traffic movement, traffic flow routes on site, and queuing areas. Moreover, the planned design had considered a separate collection of leachate into isolated/sealed tank with a capacity of 5 m^3 by gravity through collection pipes. Storm water will be collected separately at the transfer station to be used for irrigation purposes or direct infiltration or disposal to the surrounding areas. In addition to that, a separate network for wastewater collection will be established and connected to the main sewer system. Trees and plants along buffer zone considered as well to provide ample space and enhance air quality.

The environmental and social baseline data is divided into three parts:

- **Physical Environments:** including the description of the site topography, soil, groundwater, noise, ambient air quality and metrological conditions;
- **Biological Environment:** including fauna and flora;
- S**ocio-economic Aspects:** including the description of general population and demographical indicators, Rafah population, waste generation and composition, land use and urban planning, roads and transportation, transportation of waste material and the collection system.

A social survey using questionnaire was distributed over 100 households surrounding the proposed site for the transfer station. A workshop on 17/11/2016 was also conducted with stakeholder's representatives including MDLF, JSC-KRM, Rafah Municipality, UNRWA, NGOs, local community representatives, Environmental Quality Agency (EQA) and Ministry of Local Governorate (MoLG). The discussion with different stakeholders includes identification of potential social and environmental impacts of the transfer station and possible mitigation measures.

The baseline data is mostly available in previous ESIA of GSWMP which was conducted in 2012, an update is carried out from other sources such as documents shared by Municipal Coastal Water Utility (MCWU) and Municipality of Rafah about groundwater quality and groundwater wells, other recent studies were used also for updating the air quality factors, knowing that no water/air/soil tests are carried out during this study. In general, the available data is of satisfactory quality.

The main potential impacts on physical, biological and socioeconomic aspects during the construction phase include the impacts on:

- **Soil:** The Soil may be affected from the construction camp due to the daily work at the site.
- **Ambient air quality:** Air quality might be affected by the movement of construction trucks, and excavation works.
- **Noise:** Noise emissions due to construction work, and increased levels of noise from the movement of vehicles and trucks movements.
- **Flora and Fauna:** At the surrounding areas, a garden was observed and need to be protected from possible contaminants migration.
- **Worker health and safety:** This may include physical hazards from falling and injuries, risks from movement of heavy machinery, physical hazards from contact with disturbances.
- **Local Community:** Inconvenience of local community might result due to the last environmental impacts (Noise, Dust, …etc).
- **Job Creation:** The construction of Rafah transfer station will create about 60 new jobs.

The main potential impacts on physical, biological and socioeconomic aspects during the **Operation phase** include the impacts on:

- **Solid Waste Management**: The new transfer station will have positive impact on the solid waste management process; it will facilitate the waste management in Rafah with less operational costs and less environmental impacts comparing with the previous situation.
- **Groundwater and Soil:** The groundwater and soil may be affected from any leachate leakage.
- **Ambient air quality:** Air quality will be affected by the movement of trucks on unfinished roads during loading and unloading of wastes.
- **Noise:** Noise emissions due to operation work, and increased levels of noise from the movement of vehicles and trucks movements.
- **Flora and Fauna:** At the surrounding areas, a garden was observed and need to be protected from possible contaminants migration.
- **Transportation and Traffic:** negative impacts on the transportation and traffic include disruption of traffic movement on the main roads, probability of accidents, limited increase of traffic volume by transfer trucks and waste spillage from vehicles.
- **Local community health:** Positive impact will come true when the municipality replace using the random collection points by an engineered transfer station. In the other side, impacts will be occurred on the community health in the surrounding area, this may include, dust resulted from movement of heavy machinery, odor and gas emissions would cause nuisance to surrounding community, impacts of heavy machinery movement, the presence of pathogens, vectors and insects.

- **Worker health and safety:** This may include physical hazards from falling and injuries, risks from movement of heavy machinery, physical hazards from contact with disturbances, impacts on workers' health from contact with substances and waste.

The Environmental and Social Management and monitoring plan was proposed based on the conducted field visits, baseline environmental and social data and the interviews with MDLF, related stakeholders and questionnaire. The following is summary of the main mitigation measures for the main receptors that have to be taken into consideration during the construction and the operation phases:

- **Surface water and Groundwater:** Leachate collection system should be constructed, and the disposal should be proper to avoid groundwater or surface water pollution, in addition to transfer wastes from the transfer station to the landfill in daily bases.
- **Ambient air quality:** Water spray of the operation site to minimize dust, control the speed of the transporting vehicles, select transportation routes to minimize dust impact on sensitive receivers.
- **Noise:** Optimize the use of machines and noisy equipment, noise warning signs should be installed at the site, movement of vehicles should be scheduled carefully to minimize the impact of noise from construction machinery, optimize the use of noisy machine, and use acoustic barriers as necessary if complaints from neighbors were received.
- **Transportation and Traffic:** Restrict transport trucks travel to the hours outside the rush hours, strict monitoring to the road accidents as part of the monitoring plan, and other appropriate means to direct traffic safely through and around the project zone.
- **Local community health:** Inform residents and the public and commercial areas of work schedules as well as with the management plans prepared by the contractor, identify and isolate operation zones, and implement safety measures to protect people from injury and adjacent property from damage.
- **Worker health and safety:** Follow the instructions and guidance, and safety and security, provide temporary shoring as appropriate and needed, provide adequate hearing protection hard hats safety goggles brightly colored vests and other appropriate safety equipment to protect workers and visitors from injury, provide all required safety personal protection equipment, provide first aid kits on construction sites and ensure the presence of personnel with the minimum first aid skills at construction site all times, provide emergency paths and exits where needed, and wear all proper safety equipment at all times.

The monitoring management plan includes the responsibility of conducting the mitigation measure, monitoring responsibility, approach of monitoring, and frequency of monitoring. It is the responsibility of contractor to conduct all mitigation measures in the construction phase, while the MDLF and JSC-KRM monitor the compliance with the mitigation measures frequently. During the operation phase, JSC-KRM and Rafah municipality will be responsible on conducting the mitigation measures during operation. Clear complaint system will be activated for receiving any complaints from the local community during construction and operation of the transfer station.

1. INTRODUCTION

1.1 Background

The Gaza Solid Waste Management Project (GSWMP) is a comprehensive strategic infrastructure and capacity building project. Where Municipal Development and Lending Fund (MDLF) is managing the southern component of the project, with its financing partners: the France Development Agency (AFD), the European Union (EU), and the World Bank Group (WBG), in close cooperation with the Joint Service Council for Solid Waste Management in Khan Younis, Rafah and Middle Area (JSC KRM) and member municipalities. The southern component of the project is covering the service area of JSC KRM (3 of 5 governorates in Gaza Strip, namely the Middle Area, Khan Younis, and Rafah Governorates) comprising approximately 64% of Gaza Strip's total geographic area inhabited by 46% of the total Gaza Strip's population, or approximately 800,000 people according the 2014 Palestinian Central Bureau of Statistics (PCBS) projections. The GSWMP is aiming at improving solid waste management services in the Gaza Strip through the provision of efficient and environmentally- and socially-sound waste disposal schemes, and initiating measures to improve overall solid waste management systems. Through the GSWMP, a sanitary landfill is currently constructed in the southern region of Gaza Strip (Rafah) with capacity to serve the 3 governorates until year 2025, and to serve the entire Gaza Strip until the year 2040.

The new facility will be equipped to operate at high standard and it will be complemented by a system of three solid waste transfer stations in southern part of Gaza Strip, one of which (Khan Younis) was constructed by UNRWA financed by Islamic Development Bank (IsDB). The other two transfer stations, in Tal Al-Sultan – Rafah and Deir El-Balah – Middle Area, are financed within this project. The site in Rafah is available and it is owned by the Municipality of Rafah as it is located near a pilot composting plant- a project financed by the Government of Japan through UNDP. MDLF have contracted a local consultant in 2016 for the study of "sitting and design of solid waste transfer stations in Middle Area and Rafah governorates".

The consultant of the "siting and design study" had applied a conceptual design phase provides a description of the proposed system in terms of a set of integrated concepts about what it should do, behave, and look like to serve Rafah governorate.

In Rafah Governorate, Solid Waste Management is a major responsibility of Rafah municipality and JSC KRM. The daily amount of municipal solid waste (MSW) generated in Gaza strip estimated to be around 1800 tons per day in 2015 (DHV ENFRA and TECC, 2012). The municipal solid waste quantity could be increase to around 3200 tons per day by 2030 in Gaza Strip referring to great increase of Gaza population (Afifi, 2015). For Rafah City, it is estimated that the average generation of MSW is about 120 ton/day. The Feasibility Study (FS) and Detailed Design for Solid Waste Management in the Gaza Strip, conducted on 2012, assumed that the average generation quantity of solid waste is 0.70 kg per person per day for Rafah Governorate. This includes household, commercial, market and part of agricultural waste. There are several types of waste materials generated in Rafah (Barhoum, 2004):

1. **Residential wastes** generated from households and include different frictions like food, paper, plastic, glass and metals.
2. **Commercial wastes** generated from shops and Rafah market and include food waste, paper, plastic, glass, and metals.

3. **Construction and demolition debris** generated during construction or demolitions **process** and contain concrete, steel, dirt, etc.
4. **Agriculture waste** generated mainly in the rural area and contains mainly plastic, agriculture waste and hazardous waste (pesticides).
5. **Hazardous waste** generated from households, agriculture, clinics, workshops, hospitals laboratories, x-rays labs, batteries and painting shops.
6. **Medical wastes** generated from hospitals, clinics, and pharmacy, laboratories that include human liquid, pathological waste, sharps materials, chemicals and dressing.
7. **Chassis and metals** generated from workshops and small-scale steel shops.

This report is prepared for carrying out an Environmental and Social Management Plan (ESMP) for Rafah Transfer Station. The ESMP will include the proposed mitigation and monitoring measures during construction and operation phases of the transfer station, based on the existing baseline information and the expected potential impacts significant on the physical environment, biological environment, socioeconomic, and human health.

1.2 Objective of the Assignment

The objective of the study is to prepare:

1. Environmental and social impacts during the construction and operation of the proposed Rafah Transfer Station.
2. To propose mitigation measures to eliminate the environmental and social impacts for the above-mentioned site.
3. To develop Environmental and Social Management Plan (ESMP) for the proposed site. The necessary mitigation measures that would be considered and implemented during construction and operation, Final draft of the ESMP will be disclosed in electronic format on MDLF website; JSC Facebook page, Rafah Municipality website; and the World Bank InfoShop. The ESMP document in hard copy format will be available in MDLF office – Khan Younis Branch; JSC-KRM main office; and Rafah Municipality.

The ESMP study approach is based on:

- To be in conformity of the World Bank safeguard policies, taking into consideration the environmental and social regulations of the Palestinian Environment Quality Authority (EQA)
- To be based on information and data from field visits and investigations as appropriate
- Recognize the environmental and social impacts of the transfer station site, recommend control, mitigation and monitoring measures to be addressed during the implementation of the Project
- To disclose the final draft of the Environmental studies

Identify key environmental and social impacts of the the site during both *construction* and *operation* phases.

Identify mitigation measures for all expected adverse environmental and social impacts during both *construction* and *operation* phases.

Propose Management plan during both construction and operation phases for the site.

Provide MDLF with the necessary recomendations and advise on the site.

1.3 Project Location Alternatives

Two alternative locations for Rafah solid waste transfer station were proposed by Municipality of Rafah and JSC-KRM. MDLF conducted a stakeholder consultation meeting to choose the most feasible location in term of environmental, social, and technical aspects. The consultation meeting was held in Municipality of Rafah in presence of the Designer, Traffic Specialist, Environmental and Social Assessment Specialist, Engineers of Rafah Municipality and JSC-KRM, and MDLF staff. Accordingly, the consultant prepared several initial conceptual drafts for both locations for discussion. Site visits were also carried out for both locations to check the access roads, the surrounding activities, and any unforeseen indicators.

Figure 1. The proposed alternatives sites of Rafah Transfer Station

The designer referred to EPA standards to measure the minimum required space of the transfer station. The approach to estimate the required tipping floor space is to begin with a base area of 4,000 square feet (371.6 m^2) and add to it 20 square feet (1.85 m^2) for each ton of waste received in a day (assuming the waste will be temporarily piled 6 feet high on the tipping floor). However, the available space for both locations is much higher than these limits.

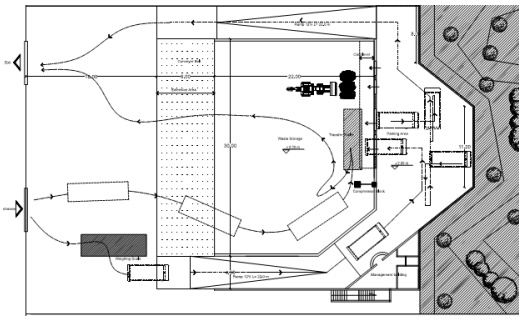
Finally, it was agreed to exclude the second choice (location B) due to its location beside a steep cliff, and the limitation of future expansion, moreover the access roads of this location is limited and could be difficult for trucks to income and outgo from this location, whereas the first choice (Location A) is surrounded by WWTP, garden, and waste sorting facility, and it can be expanded in the future (if needed), and it has a separate access road which will not impact any traffic jam for other activities. It is worth mentioning that (Location A) which its area is about 6,000 m^2 is fully empty and it is owned by the municipality of Rafah/JSC-KRM. So that (location A) had been chosen.

Figure 2. Stakeholder Consultation meeting in Rafah Municipality

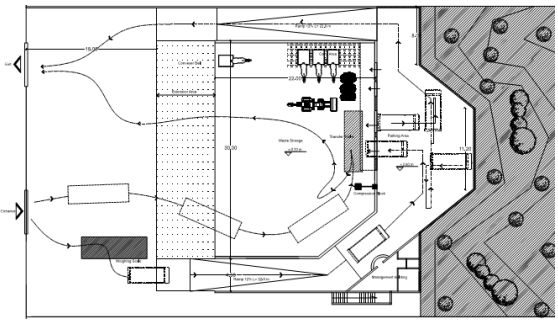
Figure 3. Site visit to the proposed locations of Rafah Transfer station

1.4 Alternative Design and Technology

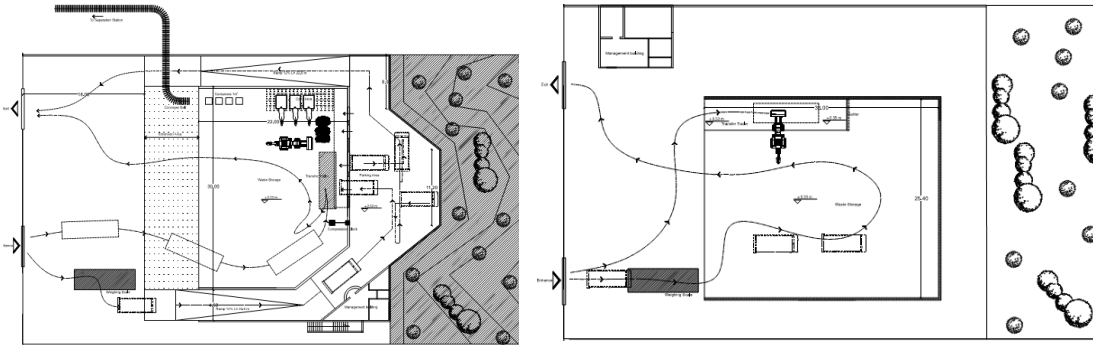
The Designer submitted four Concept Design alternatives for Rafah waste transfer station as shown in the Figures below (4. a, b, c, d). The alternatives were discussed with MDLF, JSC-KRM and Municipality of Rafah. The chosen alternative is also improved to be complied with the Environmental and Social safeguards, and to achieve the technical goal. Municipality of Rafah had a good role in improving the concept design, and they also participated in discussing the detailed electrical and mechanical design.



a. Alternative layout (1) Two levels standard



b. Alternative layout (2) Two levels with carts area



c. Alternative layout (3) Two levels with conveyor belt for sorting facility

d. Alternative layout (4) one level horizontal

Figure 4. Alternative concept designs of Rafah transfer station

The designer was requested to increase and change the location of planted trees to be as a barrier between the transfer station and the surroundings to mitigate any noise or dust emissions (if any), the location of the tree barrier is located against wind direction. The designer also requested to cover the working area by a steel shed, and to take into account to separate the leachate collection system. The transfer station is fully closed by a concrete wall and it included green areas for atheistic aspects; its ground is also fully paved by concrete to prevent any leachate leakage. The Designer was also requested to include a source of water for washing the working area and the solid waste trucks. The transfer station has two separate ramps for incoming and outgoing waste vehicles, and the design took into consideration the nature of incoming vehicles including trucks and donkey carts.

1.5 Rafah Transfer Station Location

The selected site of Rafah Transfer Station is owned by Municipality of Rafah. It is located to southern part of the city, to the south of Tal Al-Sultan area, near the Rafah Wastewater Treatment Plant (RWWTP) with a total area of about 6,000m^2 (Figure 5). The factors, which considered when choosing the site:

- Served area
- Distance to Sofa landfill
- Site zoning, design and size requirements
- Site topography and geometry
- Land Ownership
- Site available area / capacity
- Other expected service, trucks parking, maintenance garage, and recovery facilities (separation, composting and recycling).

The transfer station will serve Middle and Western area of Rafah City including Tal-Al-Sultan and newly constructed neighborhoods. The main access road to the site is a minor connecting road with 12m width and 200m long branched from the main street in Rafah (Abu Baker St.).

Figure 5. Location map of Rafah transfer station (Image from Google Earth 23.03. 2016)

1.6 The Proposed Transfer Station Type

Rafah Transfer station design system is partially open top structure as shown in Figure (6). The design of the transfer station considered a closed top for the tipping area taking into consideration the following key criteria:

- Simple to Construct and Operate;
- The ability to receive the collected wastes by vehicles and donkey carts;
- Feasibility analysis (Minimum Operation and Maintenance costs and Minimum Construction Costs);
- Distance to the Landfill;
- Future Expansion;
- Integration with other Facilities – Separation;
- Considering the local conditions, mainly electricity;
- Emergencies;
- Availability of trailers and their types and capacities;
- Types and quantities of wastes;
- Other related activities (separation, recycling and composting).

Figure 6. The conceptual plan design of Rafah transfer station

The system of dumping is direct tipping into the trailer below as shown in Figure (7). The transfer station design system will be a flexible structure for accommodation of the used primary collection systems by donkey cars or primary collection vehicles used in the served area as shown in Figure (8).

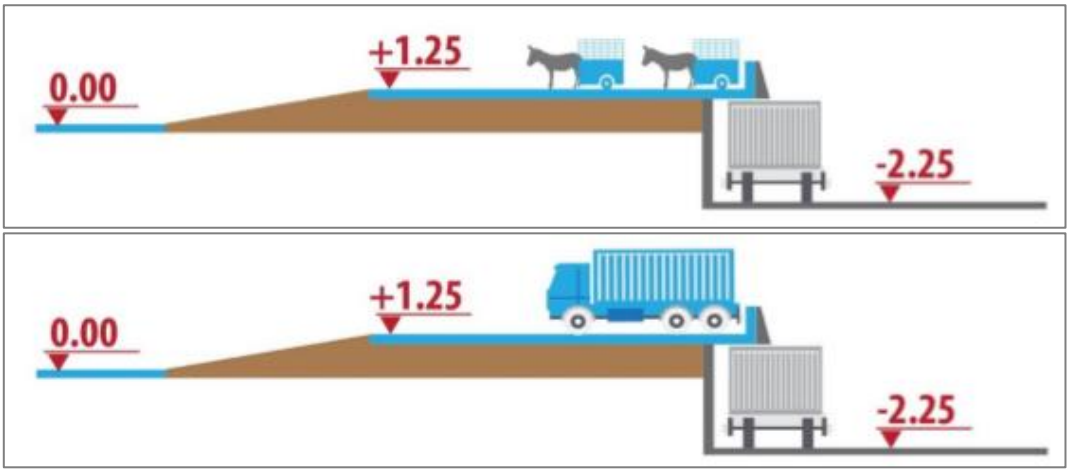


Figure 7. Sections explain the heights and levels on the transfer station according to One-top system

1.7 Transfer Station components and design

The following section will present the main components and design elements of planned Rafah transfer station:

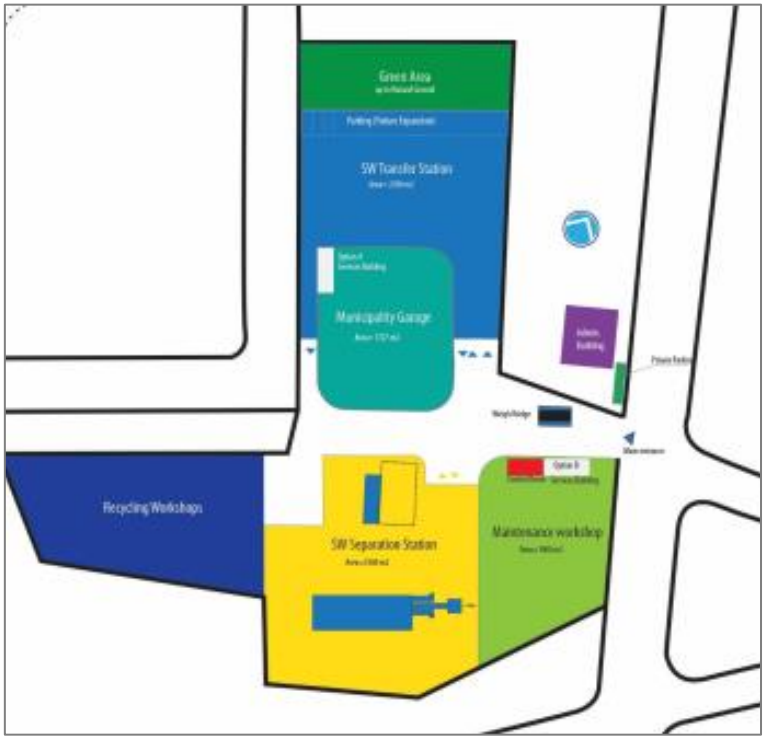
1- Main Transfer Station Building / tipping area: The planned transfer station will have the following components:
- Parking areas: Employees, visitors, and transfer vehicles;
- Truck washing station;
- Isolated/sealed tank for leachate;
- Space for future expansion of the main transfer building;
- Buffer areas/environmental protection: Open space, landscaping, trees, berms, and walls that reduce impacts on the community;

- Roofing and cover including roof structure over drop off points and/or materials, and cover over and around waste storage points;
- Utilities and staff facilities: to ensure the access to adequate water supply to meet requirements for fire control, drinking, and washing;
- The scale house: Where incoming and outgoing loads are weighed and fees are collected /reported. (Truck Axle Weighing Scales);
- Entrance Gate and Guard House - for security, safety and control;
- Frontage boundary wall - for security;
- Administration building - for management of personnel and office facilities;
- Worker building

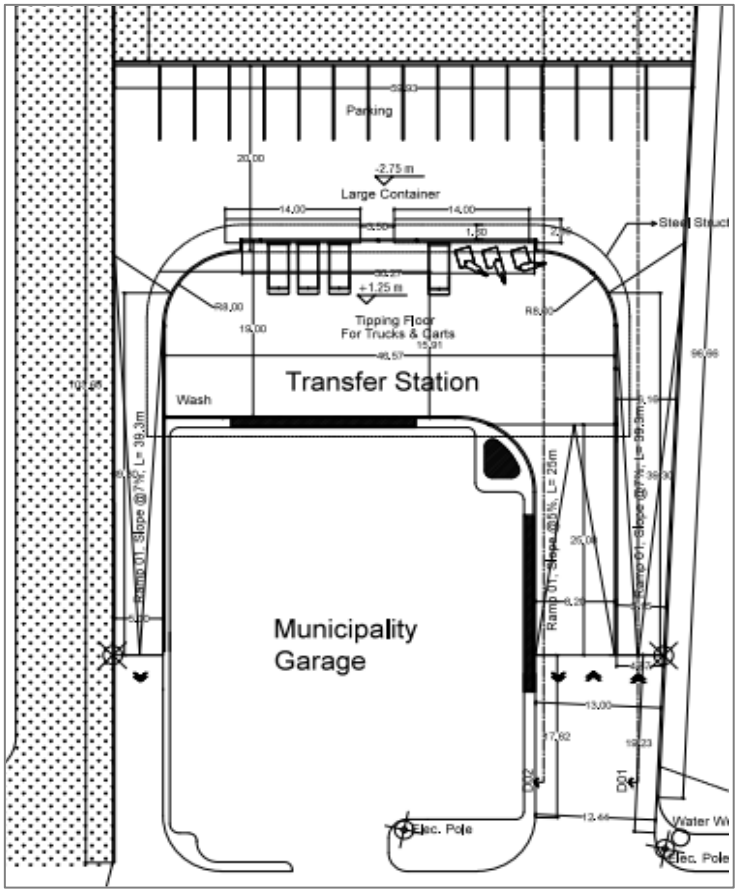
2- Other complementary and supporting Facilities:

- Workshop/Office/Equipment depot and Washing Facilities - for servicing of vehicle and heavy equipment;
- Generator House and Electrical Room - for electrical sourcing;
- Fuel Storage Structure, 10,000-20,000 liters (Future) - for storage of fuel;
- Water supply pumping station for (Vehicle Washing Facility) – for ensuring that vehicles and equipment are washed regularly (with due protection against contamination of site with refuse liquor from operations), and cleansing for the different buildings and facilities, and watering of plants, tress and gardens;
- Water supply pumping station / Water Distribution Facilities - to ensure adequate and safe water;
- Trees and plants along buffer zone - to provide ample space and enhance air quality.

Figure (8) shows the layout of the proposed transfer station which indicated the location of the transfer station its components and surrounding facilities.



(a)



(b)

Figure 8 (a,b). Layout plan of transfer station with other supporting facilities

3- Trucks Movement: The planned design facilitates a smooth and flexible movement of used vehicles through:

- Interior and Service Roads - for internal circulation and traffic movement;
- Traffic flow routes on site: Separate routes will be established for public use and for heavy truck use. Transportation designer will work to eliminate sharp turns, intersections, and steep ramps;
- Queuing areas: Queues will develop at the inbound scales, the tipping area, and the outbound scales;
- Curves and intersections along roads on or near the transfer station site need large turning radii so the rear wheels of trucks do not run over curbs or off the road when making moderate or sharp turns;
- Slopes on ramps should be limited to less than 8 percent, particularly for fully loaded transfer trailers.

4- Waste Storage and transfer container:

- Direct dump into transfer vehicle;
- Top-loading trailers and containers;
- Roll on/off trucks to transfer waste.

Considering the existing conditions and available details as well as the expected future expansion, the following Table (1) presents the criteria which had been taken into consideration at the design stage.

Table 1. The criteria taken into consideration at the design stage of Rafah Transfer Station

Criteria	Sub-criteria	Details
Solid Waste	Population	Total population of Rafah Governorate: •Mid 2016: 233,490 •Projected 2020: 264,174 •Projected 2030: 338,321 •Projected 2040: 396,704 •Rafah City and Camp is 90% of the Governorate •The served population is up to 60% of Rafah City •The average HH size is 5.2 P/HH
	Quantities (current & Future)	•Actual daily collected Quantities according to Rafah Municipality is 184 m^3 daily. (about 120 ton) •Other weight estimated Current Quantities: 120 ton/day. •Future Quantities 2040 : (60% of 463.0 ton = 278 ton)
	Waste Density	The average waste densities are assumed for Gaza: •Taken from household: 0.35 ton/m^3 •During bulk/container transport: 0.70 ton/m^3 •Immediately after disposal: 1.00 ton/m^3 •After settling on landfill: 1.20 ton/m^3
	Waste Types	Municipal Solid Waste
	Stakeholders/ customers	•JSC-RKM •Rafah Municipality •UNRWA
Location of Transfer Station	Location of the TS	The selected site is owned by municipality of Rafah. It is located to southern part of the city, to the south of Tal-Al-Sultan area, near WWTP. The Factors which considered when choosing the site: •Served area •Distance to Sofa landfill •Site zoning, design and size requirements •Site topography and geometry •Land Ownership •Site available area / capacity •Other expected service, trucks parking, maintenance garage, recovery facilities (separation, composting and recycling).
	Access Roads	The main access road to the site is a minor connecting road with 12m width and 200m long branched from the main street in Rafah (Abu Baker St.).
	Area	The site if transfer station is about 6,000 m^2
Type of Transfer Station	Open top	The recommended option, with a closed top for the tipping area
Layout considerations	Other on-site facilities	Composting Facility •Separation facility •Paper recycling workshop •Temporary transfer point (emergency)
	Traffic flow / Queuing	According to the simulation report, For trucks, no queues are expected. For carts some queues at early morning are expected. This could be manager by reorganizing the collection areas and starting time of collection.

Criteria	Sub-criteria	Details
	Collection trends & peaks & Hours of operation	The collection started from 6:00AM to 11:00AM and extended to 16:00PM • The transfer to the landfill started at 7:15 with the first roll-off truck (25 minutes from the transfer station to the landfill, 20 minutes back and 15 minutes waiting at the landfill).
	Collection vehicles	The incoming vehicles: • One tractor with capacity of 5 m3, 2 trips daily • One skip lift truck with capacity of 8 m3, 8trips daily • One compactor with capacity of 5 m3, 2 trips daily • 25 Donkey Carts, with capacity of 1 m3, 4 trips daily each
	Transporting to Landfill	4 outgoing trips, 4 roll-off-trucks with average capacity 25 m^3 each (size 690 * 230 * 160 cm).
Design considerations	Sizing and storage	According to EPA, the approach to estimating the required tipping floor space is to begin with a base area of 4,000 square feet (371.6 m^2) and add to it 20 square feet (1.85 m^2) for each ton of waste received in a day (assuming the waste will be temporarily piled 6 feet high on the tipping floor). • 371.6 m^2 + 1.85 m^2 * 120 ton = 371.6 m^2 + 222 m^2 = 594 m^2 • However, the available space is much higher than these limits, (more than 1,000 for the tipping floor)
	Expansion capability	At two directions with about 50% of the design capacity
	Lighting and ventilation	Mainly Natural, and optional lighting and ventilation will be available upon needs and for emergencies. Air conditioning is applied for the administration bldg.
	Wind direction loading	The design considered in the architecture design of the shed and structural design to avoid any wind impacts. The detailed design considers the aesthetic features, environmental and social impacts
Emergency		The transfer station is designed to accumulate some quantities during emergencies: • At the tipping floor for one/two day (about 500-1,000 m^3) • At the trailers movement area for 4-5 days (up to 2,500m^3)
Landscaping	Trees and design	The design will consider the aesthetics of the area. The design includes landscapes, open space, trees, and trees belt around the station.
Leachate	Leachate collection and disposal	The leachate dilution will be the solution for the high strength waste; however some heavy metals could be another issue. The treatment process at Rafah WWTP could not be influenced by this problem considering the small amount of diluted leachate at the transfer station. Generally, the WWTP comprises toxic and hazardous waste. It is recommended to test these concentrations periodically as a risk measure regarding the environmental impact of sending the diluted leachate from the transfer station to the Rafah WWTP. Accordingly: • A leachate collection system will be available according to the standards to collect the leachate at unloading points (to be transferred by gravity through collection pipes to the underground tank with capacity of 5 m^3). The collected leachate will be evacuated and transported separately to the leachate pond in Sofa landfill in order to be biologically

Criteria	Sub-criteria	Details
		treated. This Leachate system is a separate system to avoid mixing with wastewater and storm water.
Storm Water		The storm water will be collected. Two strategies are considered: •Collection for irrigation purposes •Collection and disposal to the surrounding areas
Wastewater		A separate system is available and connected with the municipal wastewater
Weighting Bridge		Its available in the current site with dimension 3*9 m (Truck Axle Weighing Scales)
Parking Area		1,700 m^2 for parking, for about 35 trucks and vehicles
Maintenance Garage		1,555 m^2 with admin rooms, stores, and labors facilities. It includes all maintenance activities (current and future)
Administration Building		2 stories administration building is designed (one floor for the transfer management and JSC-RKM) and the second one is for municipality environmental health department

1.8 Leachate separate collection at Rafah Transfer Station

Leachate will be received to the underground leachate tank with a capacity of $5m^3$ by gravity through collection pipes as shown in Figure (9). Leachate will be evacuated with maximum period of three days and transported separately to the leachate pond in Al Fukhary landfill in order to be biologically treated. Leachate system is a separated system to avoid mixing with wastewater and storm water. The expected quantities of leachate is about 1.5 cu.m/day.

1.9 Storm Water Collection

Storm water will be collected separately at the transfer station. The collected storm water could be used for irrigation purposes or direct infiltration or disposal to the surrounding areas.

1.10 Traffic, water sources and waste water

Traffic movement at the transfer station illustrated in Figure (10) where there is separate entrance and exit to the trucks with easy loading and unloading. Water well will be established for the purposes of potable water used in the site mainly for vehicles washing. A separate network for wastewater collection will be established and connected to the main sewer system.

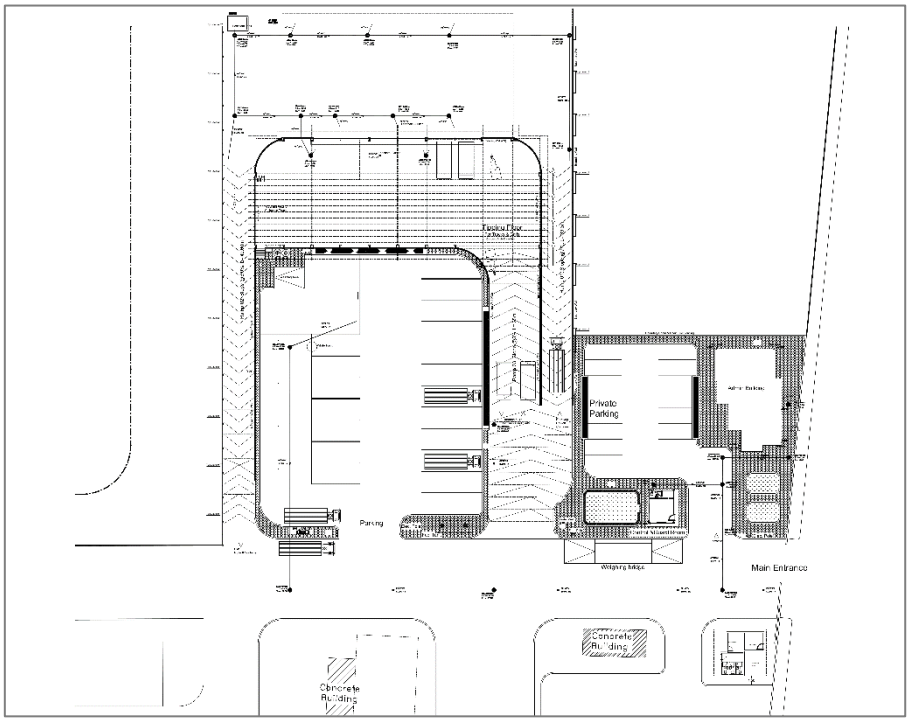


Figure 9. Leachate Collection at Rafah transfer Station

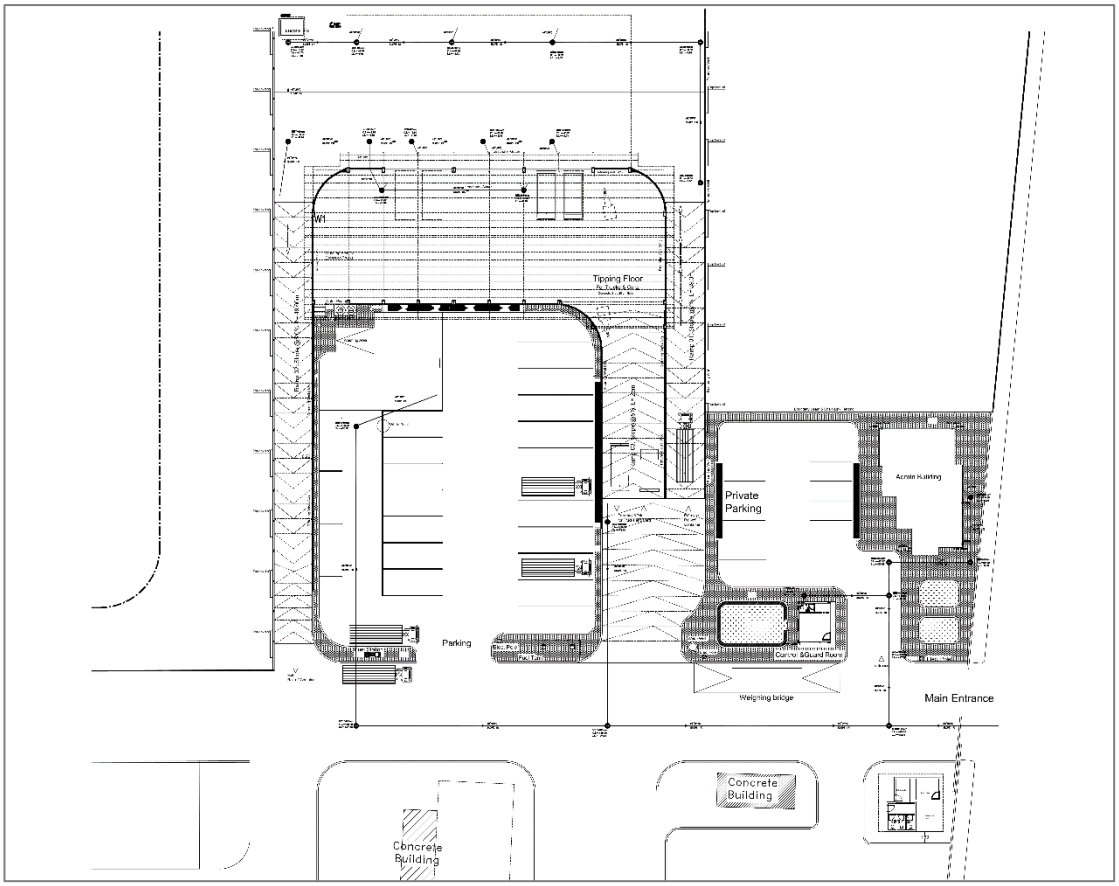


Figure 10. Traffic, water sources and waste water layout

1.11 Key Construction Activities

The construction materials and construction equipment are available in the local market. The quantity of excavation works is 3000m^3, all the excavation soil will be stored near the site for backfilling. However, the excavation works are limited, and there is no expectation to import additional soils from other locations. The construction works is expected to last for more than eight months, Table (2) shows the key construction activities with their duration and if there are special machines would be used.

Table 2. Construction Key Activities with duration

Activity	Duration (days)	Special machines
Excavation works	6	
Concrete works	100	
Masonry works	20	
Tilling works	7	
Plastering works	7	
Painting works	7	
Carpentry and joinery works	5	
Steel sheds & Metal works	25	Cranes
Mechanical works	12	
Electrical works	12	
Road works	45	
External work& Landscaping	15	
Total	261	

1.12 Employment and Equipment

The construction of transfer station is expected to create about 60 job vacancies for engineers, workers, drivers, and guards. Those people will have been divided into groups and will work in the site according to a time schedule upon the construction and building phases and needs, and it is expected not to exceed 25 workers at the same time in the same working phase. The contractor will be requested to cover the insurance of all employees and comply with the safety and health measures for himself and for the workers of all the sub-contractors working under him. The hired employees are expected to be from local community (Rafah Governorate), others can come daily from the other near governorates. Since Gaza governorates are all very close in terms of culture and customs, no issues are expected in terms of how the workers coming from different places will be dealing with each other and the neighbouring communities. Moreover, no workers will be accommodated overnight in the project locations and all will commute to their Governorates of residence and means of transportations are available all the time to allow for that. The contractor will be requested to comply with this ESMP during the construction phase, whereas MDLF and JSC-KRM will monitor the compliance to the mitigation measures including the workers' insurance issues and the establishment and the application of a code of conduct for workers as indicted in Table 9.

The contractor will be requested to have insurance for all equipment inside the construction site, uncovered equipment by valid insurance will not be allowed to enter the site.

The contractor will train the workers before starting the construction activities on how to deal with the local community, their code of conduct and the used grievance redress mechanism, besides the health and safety instructions and guides in the construction site.

During the operation phase, limited job vacancies will be created (about 3 - 4 jobs) divided on the TS guides, and TS manager. JSC-KRM commits to comply with the ESMP requirements during the operation phase.

2. DESCRIPTION OF THE LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Description of Legal Framework

National and international guidelines are reviewed in addition to the most pertinent regulations and standards governing health and safety. The following are the main laws and guidelines:

- Palestinian Environmental law 7, 1999
- Solid Waste Management Regulations (2004)
- National Strategy for Solid Waste Management in the Palestine, 2010
- Palestinian Environmental Assessment Policy
- Draft Policy of Solid Waste Management in Palestine
- Environmental and Social World Bank Policies and Guidelines

2.1.1 Palestinian Environmental law 7, 1999

The Environmental Law of Palestine (PEL) includes a framework for environmental protection including SWM and sets roles and responsibilities for the EQA as follows:

- To build up a national solid waste management strategy and takes responsibility of monitoring its implementation (Article 7).
- To minimize waste generation and promote recycling and reuse. At the bottom of the waste hierarchy, waste shall be disposed of in regulated and properly selected sites (Articles 8 to 10). However, no regulations or instructions on how to implement these measures are issued to date.
- To ensure a safe disposal of hazardous wastes and to prohibit the import of such waste to Palestine (Articles 11 to 13). However, no waste acceptance criteria have been developed for hazardous wastes, no identification list for hazardous wastes has been also identified.
- To prohibit the incineration of garbage and solid waste unless performed according to Ministry's instructions and standards (Articles 23).

2.1.2 Solid Waste Management Regulations, 2004

The Solid Waste Management Regulations, issued by the EQA in 2004, are the first trial to develop regulations that aims to complement the Environmental Law, these include the following key guidelines related to waste collection:

- MSW collection is the responsibility of municipalities and village councils, as well as ensuring that this the process does not have health and/or environmental implications.
- It is prohibited to dispose of waste outside the street containers designated for this purpose. These containers should be closed and manufactured out of a metallic or similar material. The number of these containers should be sufficient and waste has to be collected at least three times per week in urban areas.
- It is the responsibility of industrial, commercial and agricultural waste generators to arrange for the collection and transport of their wastes to the designated treatment/disposal areas. This has to be pre-arranged with the authorities.

2.1.3 National Strategy for Solid Waste Management in the Palestinian Territory, 2010

The National Strategy for Solid Management in the Palestinian Territory aims at establishing the framework to all decisions, programs, activities, and mid-term investment plans to develop the solid waste sector in Palestine. The following are among the strategy's policies:

- Policy (1) – Strategic Objective 1: Development and update of the legislative framework supporting integrated SWM
- Policy (2) – Strategic Objective 1: Strengthen the organizational framework of national institutions and supporting their complementary roles in SWM.
- Policy (3) – Strategic Objective 2: Establishing an integrated, coordinated, and sustainable institutional approach to support institutional capacity building in the SWM sector.
- Policy (4) – Strategic Objective 3 : Developing the current management systems for SW collection and transport , in order to improve the quality and effectiveness of services and its availability to all citizens
- Policy (5) – Strategic Objective 3 : Safe and efficient disposal of SW in regional sanitary landfills servicing all communities
- Policy (6) is concerned with diverting waste from landfills through waste minimization, reuse and recycling. The MoLG shall play a vital role as the key executing party for achieving most of the strategic objectives. This shall be considered in any new institutional set-up for SWM in GS. The municipalities in GS are the main parties responsible for the SWM at all stages including primary collection, secondary collection, and landfill management.
- Policy (7) – Strategic Objective 3: Prohibiting the use of random dump sites and closing or rehabilitating the existing sites to limit their environmental and health risks.

2.1.4 Projects Approval Requirements

Article 45 of the PEL; "The Ministry (EQA), in coordination with the competent agencies, shall set standards to determine which projects and fields shall be subject to the environmental impact assessment studies. It shall also prepare lists of these projects and set the rules and procedures of the environmental impact assessment".

Article 47 of the PEL states that; "The Ministry (EQA), in coordination with the competent agencies, shall determine the activities and projects that have to obtain an environmental approval before being licensed. This includes the projects that are allowed to be established in the restricted areas".

According to the PEL and the Palestinian Environmental Assessment Policy (PEAP) which was approved through resolution No: 27-23/4/2000, the project proponent must first obtain an initial approval from the appropriate ministry or local planning committee. The proponent then submits an application for environmental approval to the EQA. The EQA notifies the appropriate permitting authorities that an application for environmental approval has been received. The application should also list what environmental and other permits must be obtained and complied with, indicate how the expected conditions of these permits will be fulfilled, and include a signed statement by the proponent that these conditions will be fulfilled. Based on the application submitted to the EQA, screening criteria are used to determine whether an initial environmental evaluation would be sufficient for the project of concern or whether a comprehensive EIA is required. Under these screening criteria, the GSWMP falls under the category of major projects and therefore it is required to submit an EIA. An Inter-Ministerial Committee is formed to approve the EIA, following which an environmental clearance is given to the project. The EQA is expected to liaise with the institutions of concern with respect to the project.

Role of the Environmental Assessment (EA) Inter-Ministerial committee in EIA approval
The project owner must first seek an initial approval from the competent authority on the proposed project.

- After obtaining initial approval from the competent authority, the project owner must apply for an environmental approval from the MEnA branch offices.
- An initial environmental assessment shall be conducted in order to approve/reject the proposed location for the project.
- The project shall be compared against the newly proposed classification systems. Then it is determined whether or not the project will need an initial environmental assessment or a full EIA study.
- For an initial environmental assessment, the feedback shall be given in a period of 14 days. For a full EIA study, the EIA report shall be revised by the branch office, environmental protection department, environmental assessment department, environmental approval department. The feedback shall be given within 21 days.
- Upon approval of the EIA study, copies of the report will be distributed on the environmental assessment committee in the different ministries and relevant authorities. The EA committee shall discuss the EIA report and give recommendations.
- The recommendations of the inter-ministerial EA committee shall be addressed in a period of maximum 28 days. The EA committee will review again the final version and send feedback in period not exceeding 21 days.

An Environmental Approval may specify:

- Required measures to mitigate adverse environmental impacts or capture potential environmental benefits, including a compliance schedule. This may include land compensation measures issued by the Higher Planning Council after reviewing the project. The procedures involve the Ministry of Finance, the MoLG and municipalities of concern.
- Measures that the proponent must implement in order to comply with relevant standards and requirements.
- Monitoring and reporting duties of the proponent.
- The project proponent shall express the commitment to the standards and requirements for the protection of the environment and to apply all the required mitigation measures addressed in the EIA. As well as, ensuring the legal commitment towards the EIA.

2.1.5 World Bank Safeguard Policies and Guidelines

The World Bank (WB) has ten environmental and social policies referred to as the Bank's "Safeguard Policies". As according to the WB Operational Policy on Environmental assessment (OP 4.01), an environmental and social category is assigned to an investment project after appraisal and before public disclosure during the International Finance Corporation project/investment cycle. Projects are assigned a category of A, B, or C, in descending order of environmental and social sensitivity. The Gaza Solid Waste Management Project (GSWMP) falls under the environmental Category (A) which includes landfill subprojects. These types of projects require a detailed ESIA and should include the following:

- Environmental and social baseline describing the existing environmental and social conditions prior to the project being constructed and operating.

- Identification of potential environmental and social impacts resulting from the project of concern.
- Comparison of alternatives sites, scenarios, technologies and designs.
- Mitigation Plan for potential impacts including monitoring.

Among the remained nine safeguard policies of the WB, other four policies are relevant to the GSWMP and these are listed and discussed below:

Involuntary Resettlement (OP 4.12)

The WB Operational Policy OP 4.12 on Involuntary Resettlement deals with involuntary resettlement in wider terms than the physical displacement of people due to development projects. It rather considers individuals who might be subjected to other sorts of adverse economic impacts on their livelihoods. The overall objectives of the Bank's policy on involuntary resettlement are:

- Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs;
- Where it cannot be feasibly avoided, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the displaced persons to share the project benefits.
- Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs and compensation measures; and,
- Displaced persons should be assisted in improving their livelihoods and standards of living or at least in restoring them, in real terms, to pre- displacement levels or to levels prevailing prior to project implementation, whichever is higher.

The World Bank's Policy on Access to Information

This policy details the Bank's requirements for making operational information available to the public. The Bank reaffirms its recognition and endorsement of the fundamental importance of transparency and accountability to the development process. In addition, timely dissemination of information to local groups affected by the projects and programs supported by the Bank, including non-governmental organizations, is essential for the effective implementation and sustainability of projects.

Underlying the policy is the principle that the World Bank (namely the International Bank for Reconstruction and Development and the International Development Association) will disclose any information in its possession that is not on its list of exceptions.

The policy also outlines a clear process for making information publicly available and provides a right to appeal if information-seekers believe they were improperly or unreasonably denied access to information or there is a public interest case to override an exception that restricts access to certain information.

Natural Habitats (OP 4.04)

The WB does not finance projects that degrade or convert critical habitats. Effects on noncritical habitats would be tolerated only if no alternatives are available and if acceptable mitigation measures are in place. It is essential to apply a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development.

Physical Cultural Resources (OP 4.11)
Many physical cultural resources are not documented, or protected by law, therefore, it is important that a project's potential impacts on physical cultural resources be considered at the earliest possible stage of the project planning cycle. consultation is an important means of identifying such resources, documenting their presence and significance, assessing potential impacts, and exploring mitigation options.

The task team (TT) advises the borrower on the provisions of OP 4.11 and their application as an integral part of the Bank's environmental assessment (EA) process as set out in OP/BP 4.01, Environmental Assessment. The steps elaborated below follow the project cycle processes of screening, developing terms of reference (TORs) for the EA, preparing and reviewing the EA report, and project appraisal, supervision and evaluation.

Environmental, Health, and Safety (EHS) Guidelines follow the IFC performance standard 3. General EHS Guidelines: Environmental Waste Management address Industry Sector Guidelines including waste management facilities. Facilities that generate and store wastes should practice the following:

- Establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences.
- Establishing a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes.
- Avoiding or minimizing the generation waste materials, as far as practicable.
- Where waste generation cannot be avoided but has been minimized, recovering and reusing waste
- Where waste cannot be recovered or reused, treating, destroying, and disposing of it in an environmentally sound manner.

2.2 Description of Institutional Framework

2.2.1 Palestinian Environment Quality Authority (EQA)

EQA has developed the Palestinian Environmental Strategy (PES) 2000-2010, with the objective to identify and analyze the main environmental problems and their causes in Palestine, to define environmental targets and to present series of prioritized measures that will lead to reaching these targets. The implementation of the strategy requires the monitoring of the environmental conditions in the Palestinian territories and the enhancement of public awareness of the people regarding environmental protection and conservation. EQA is primarily concerned with the development of regulations, strategies, management plans and monitoring programs, with an aim of sound use and conservation of the environmental resources in Palestine. EQA is also responsible for approving the Environmental Impact Assessments for solid waste projects. One other major role and responsibility that EQA emphasizes upon is public awareness promoted through educating and training environmentalists and the public.

2.2.2 Solid waste Joint Service Council for Khan Younis, Rafah and Middle Area (JSC-KRM)

The Solid Waste Management Council (SWMC) was originally established in 1995 to serve the governorates of Khan Younis and Deir El-Balah (Middle Area). The Council's mandate included the provision of secondary waste collection (collection from the containers) in addition to waste disposal through operating Deir El-Balah Central Landfill, which was built in 1995 and extended in 2002 by the support of the Federal Republic of Germany. The council was expanded in 2012 to include the local government units (LGUs) in the Governorate of Rafah, increasing the total number of LGUs served by the council to 17 under the name of The Joint Service Council for Solid Waste Management in the Local Government Units in the Governorates of Khan Younis, Rafah and the Middle Area (JSC-KRM). Council services comprise approximately 64% of Gaza Strip's total geographic area inhabited by 46% of the total Gaza Strip's population, or approximately 800,000 people according the 2014 Palestinian Central Bureau of Statistics (PCBS) projections. The Joint Service Council is an independent entity governed by Statutes approved by the Palestinian Ministry of Local Government. The operating expenses of the Council are primarily covered by the contributions of member LGUs.

2.2.3 Rafah Municipality

Rafah municipality is responsible for its own solid waste management. The Solid Waste department of the municipality serves the city of Rafah, as well as adjacent villages of Al Naseer, Shoka and Al Fukhary. Waste management services are provided by the municipal's health department. Its organization structure is presented in the next Figure (11).

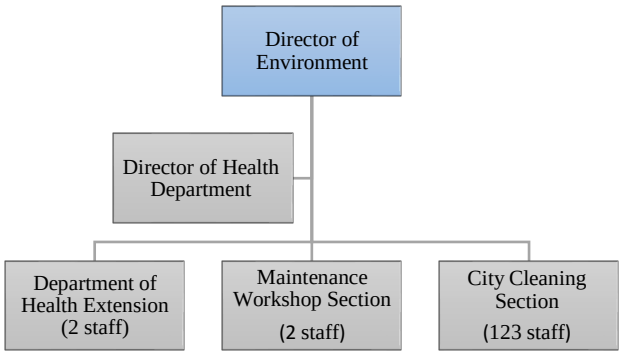


Figure 11. Organization Chart – Rafah Health Department

The waste is mainly collected on a door-to-door basis, with exception of surrounding villages, where waste is collected using 1 m^3 waste containers, located along the streets. The municipality operates a total of 95 containers in the rural areas. Urban commercial areas are served once a day, the urban residential areas about 3 times per week, and the containers in the rural areas are emptied about twice a week. About 50% of the waste is directly transported to the Rafah Landfill. The other 50% is first disposed of at the transfer station south of Rafah (Tel al Sultan, about 10 dunums), before being transported in bulk to Rafah Landfill.

2.2.4 Municipal Development and Lending Fund (MDLF)

MDLF is implementing the GSWMP in the Southern region of Gaza with its financing partners through the provision of more efficient, environmentally and socially sound waste disposal systems, and by initiating measures to improve Gaza overall solid waste management system. Thus; MDLF as the Project Implementing Entity is responsible for ensuring the achievement of the project objectives. The MDLF would undertake this role primarily through the Project

Development and Safeguards Unit (PDSU); which is a new and semi-autonomous project development unit based in Gaza.

3. ENVIRONMENTAL AND SOCIAL BASELINE DATA

Introduction

Rafah waste TS is located nearby an existing material sorting facility owned by Rafah municipality in the western side of the city. During the field visit conducted on 6th of September 2016 it was noticed that the transfer station is surrounded by garden and playground at the northern parts of the TS, industrial area, Waste Sorting Facility and stone crashers at the eastern parts, and Rafah WWTP from the south (Figure 12), the nearest residential area is far more than 350 m. Rafah waste Transfer Station is far about 9,800m, and 16,700m from Sofa dump site, and Dier Al Balah Landfill consequently (Figure 13). The exiting solid waste in the site is collected regularly by Rafah municipality. No waste pickers have been noticed within the site visits to the station. The environmental and social baseline data reflects the existing situation at the transfer station site and the surrounding environments. Thus, it is divided into three categories:

- Physical environment
- Biological environment
- Socio-economic baseline data

Figure 12. Location of Rafah Transfer Station and the surrounding environment

Figure 13. Distance between Rafah transfer station and Dump sites

Most of the environmental and social baseline data were obtained through the review of information in ESIA of GSWMP[1] where Rafah Governorate was also studied to be covered. The environmental baseline data that was studied including meteo-climatologically conditions; ambient air quality; soil characteristics; geological survey; water resources; geophysical survey and fauna and flora. The social baseline study in ESIA involved the neighboring communities to temporary waste storage sites in 2012 of Tel al Sultan, Rafah governorate. ESIA study in 2012 revealed that a temporary waste storage site is located in Tel Al Sultan to mitigate for the challenges the limitations in transport equipment, long haulage distance to official dumpsite (Sofa dumpsite) and frequent roads blockages that prevents from regular waste transport. Several interviews and consultation activities conducted in 2012 as part of the ESIA shown that local residents surrounding Tel Al Sultan are suffering from odor and inconvenience resulting from the practice of burning waste on-site, the increase of rats, mosquitoes and flies. An update has been addressed in this report.

Under this study, structured questionnaire was undertaken to collect primary data directly from surrounding local community in Tel Al Sultan in order to garner their perceptions about the project's predicted impacts. Another important tool included under this study is consultation meeting performed by the consultant with the local community surrounding the proposed location of Rafah transfer station.

3.1 Physical Environment

3.1.1 Topography

Rafah transfer station is located in mostly flat area except of the eastern side of the proposed site as shown in Figure (14 a.b) with a gently slope towards the Mediterranean Sea. The average height at the proposed site of Rafah transfer station is about 28 to 38 m above mean sea level as shown in Figure (15).

[1] Environmental and Social impact assessment (ESIA) for Gaza Solid Waste Management Project: http://www.mdlf.org.ps/Files/Docs/GSWM%20ESIA_FINAL_19sep2012.pdf

(a) (b)

Figure 14 (a.b). Photos of the current site of the proposed transfer station

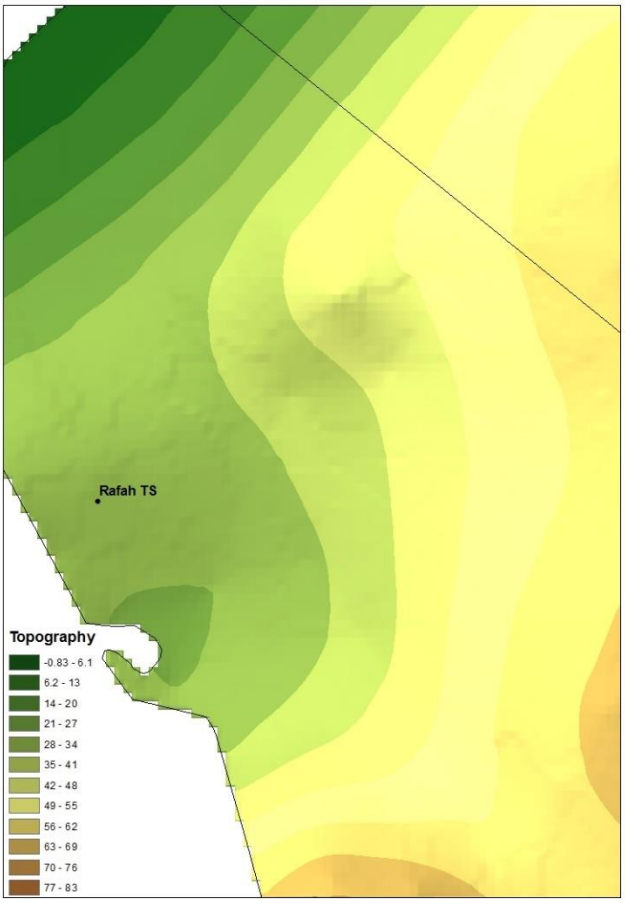


Figure 15. Topographic map at Rafah Transfer Station

3.1.2 Soil

Loess soils cover some of the Southeastern areas of Gaza strip and valley floors. The soil texture at Rafah Transfer station site is mainly sandy clay loam and sandy clay (Figure 16). The available data about Geology and soil e.g. underlying strata, and soil conditions is very limited. There is no need for detailed soil investigation for the transfer station, but it will be necessary for the maintenance workshop. According to its location and history of soil layers in its location.

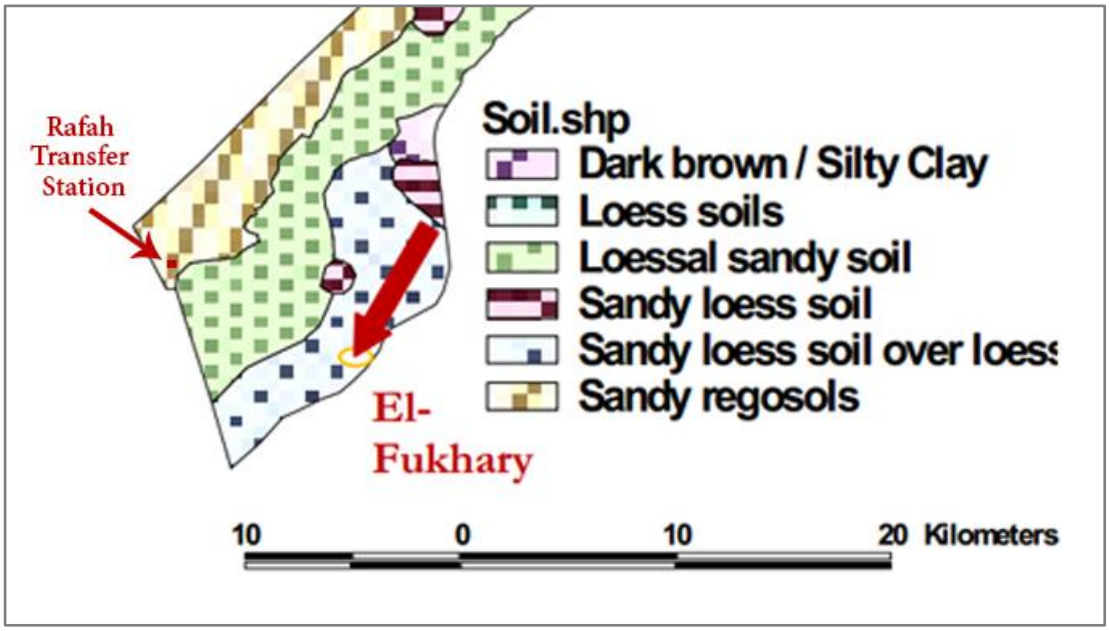


Figure 16. Soil type under the project area (ESIA, 2012)

3.1.3 Groundwater

3.1.3.1 Groundwater Level

Under natural conditions, groundwater flow in the Gaza Strip is towards the Mediterranean Sea, where it discharges to the sea. Large cone of depression have formed in the south near Rafah transfer station where water levels are below MSL, including inflow of seawater towards the major pumping centers. The groundwater level is shown in Figure (17) below, which is between 11 to 12 m below the mean sea level. Figure (18) shows no municipal wells in radius of 500m of the transfer station (the closest well is 750m).

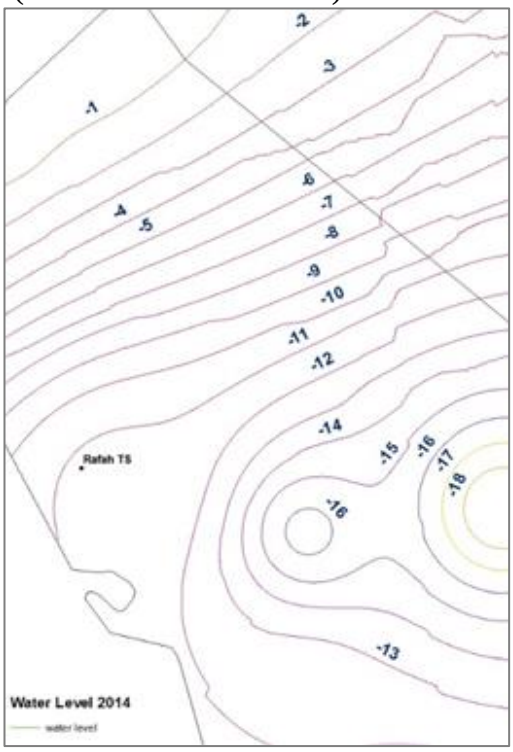


Figure 17. Groundwater level at the transfer station site in 2014, (PWA database)

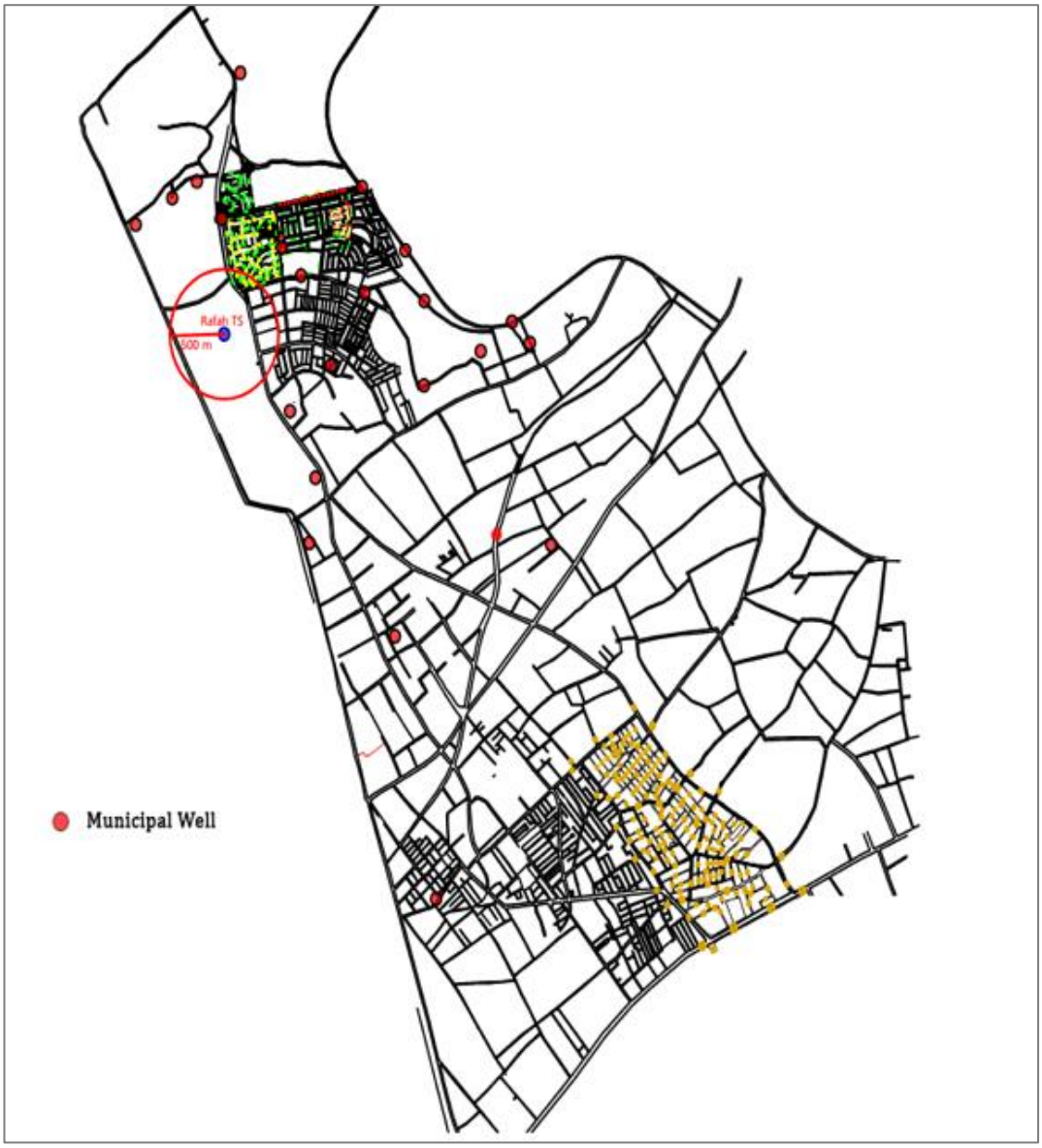


Figure 18. Municipal and Agricultural wells

3.1.3.2 Groundwater Quality

The main groundwater quality problems are elevated chloride and nitrate concentrations. Chlorides are indication of the water salinity, and nitrates are indication of the presence of organic fertilizers, wastewater, sewage sludge and artificial fertilizers. The reference level over which the water is to be considered a source of pollution is set based on the World Health Organization (WHO) drinking water guidelines:

- 50 mg/l for NO_3
- 250 mg/l for Cl^-

Figures (19) and (20) show the Chloride and Nitrate concentration, respectively, at Rafah transfer station site for the year 2015. The Chloride concentration at Rafah transfer station is observed to be between 620 to 872 mg/L. The nitrate concentration in the area surrounding Rafah Transfer Station is more than 61 to 90 mg/L based on PWA database in 2015. These measures clearly shows that both Chloride and Nitrate are more than the WHO standards.

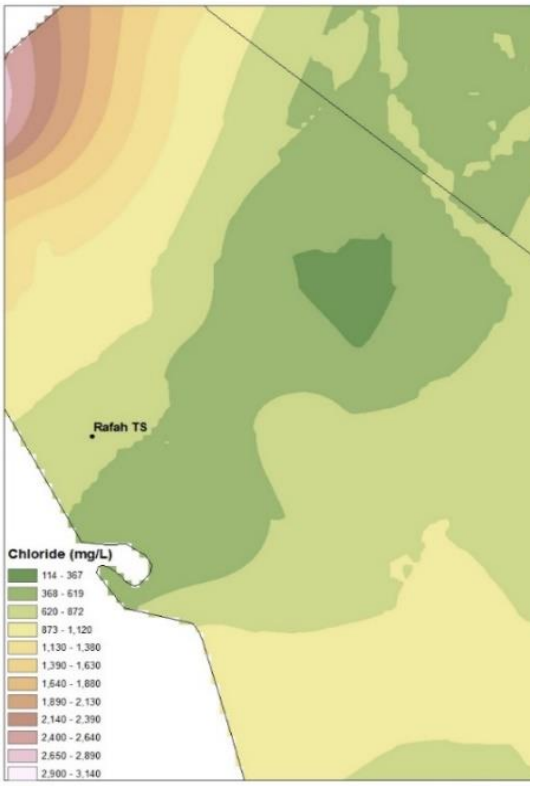


Figure 19. Chloride concentration at the transfer station site (mg/L)
(PWA database, 2015)

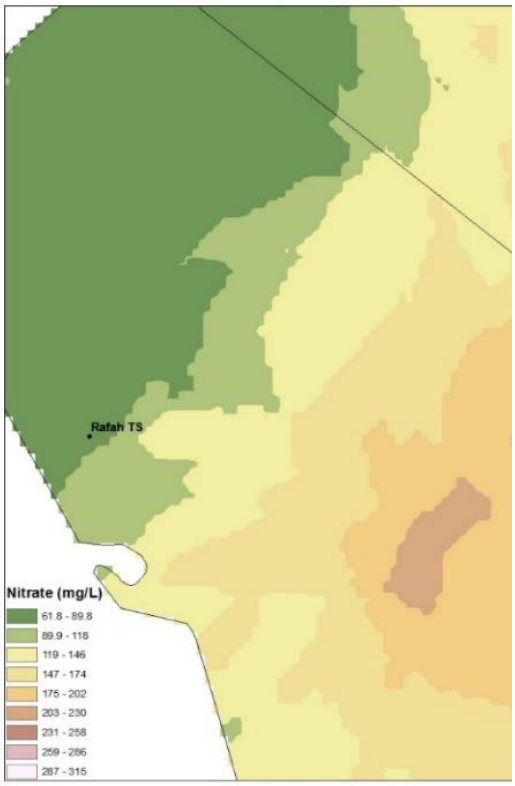


Figure 20. Nitrate concentration at the transfer station site (mg/L)
(PWA database,2015)

3.1.4 Ambient Air Quality

Figure (21) below shows a comparison of NO_x concentrations between the Gaza Strip governorates, which indicates that Rafah governorate is one the lowest recorded concentrations, 20 µg/m^3.

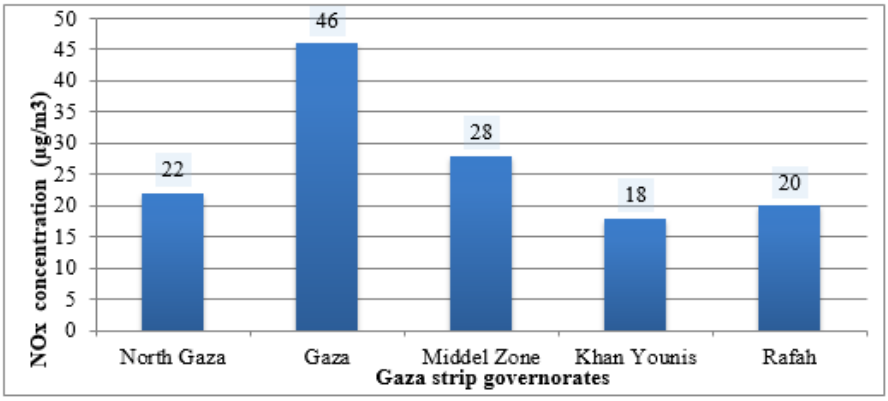


Figure 21. NOx Concentrations in several Gaza Governorates in 2015 (EPRI, 2016)

Other nuisances affected the air quality resulted from the odor of the wastewater treatment plant and the existing random transfer station point. Table (3) shows the concentration of Co, $PM_{2.5}$, and PM_{10} in two regions in Khan Younis and Rafah, The place of measurement in Rafah is far about 3km from the Rafah TS. It is found that concentration of most of Air Quality parameters are slightly low.

Table 3. Concentrations of CO, $PM_{2.5}$, and PM_{10} in Khan Younis and Rafah (Elbayoumi et. Al., 2012)

Parameter	Season	Address	Time (am)					
			07:00	08:00	09:00	10:00	11:00	12:00
Mean CO (ppm)	Spring	Khan Younis/near Naser hospital	5.37	0.83	0.91	0.54	1.21	1.18
		Rafah/ near Elshabora	1.69	1.09	0.82	0.78	1.32	0.98
	Fall	Khan Younis/near Naser hospital	0.23	0.21	0.23	0.23	0.22	0.20
		Rafah/ near Elshabora	0.64	0.60	0.60	0.61	0.61	0.60
	Winter	Khan Younis/near Naser hospital	0.82	1.90	0.70	1.69	2.31	1.62
		Rafah/ near Elshabora	1.70	1.10	0.86	2.14	1.65	1.45
Mean $PM_{2.5}$ ($\mu g/m^3$)	Spring	Khan Younis/near Naser hospital	13.89	13.95	20.58	16.56	16.00	14.96
		Rafah/ near Elshabora	28.96	22.42	19.44	14.31	15.33	14.76
	Fall	Khan Younis/near Naser hospital	18.47	18.24	27.80	23.05	22.18	20.60
		Rafah/ near Elshabora	38.27	29.60	25.73	18.91	20.27	19.38
	Winter	Khan Younis/near Naser hospital	99.58	98.80	146.02	120.62	115.31	107.51
		Rafah/ near Elshabora	194.5	151.3	131.8	97.60	104.2	100.3
Mean PM_{10} ($\mu g/m^3$)	Spring	Khan Younis/near Naser hospital	75.17	75.14	110.45	89.38	86.83	80.93
		Rafah/ near Elshabora	169.7	203.8	140.2	111.0	119.3	90.31
	Fall	Khan Younis/near Naser hospital	72.60	71.80	105.2	87.18	83.16	77.24
		Rafah/ near Elshabora	140.9	109.2	95.36	70.36	75.29	72.22
	Winter	Khan Younis/near Naser hospital	333.6	259.3	228.4	168.0	182.0	177.3
		Rafah/ near Elshabora	402.4	484.0	335.4	265.5	284.9	216.7

3.1.5 Noise

The transfer station site is located close to crowded residential and industrial areas. Major noise sources site is the traffic volume, and operation of the industrial areas and crush factories. Some noise sources are from the operation of the wastewater treatment plant located in the Southeastern parts of the transfer station. According to data obtained, the lowest noise level being measured in Rafah waste transfer station site was 47dB recorded at around 8am, whereas the highest was 78dB recorded at around 1pm. The mean daily value was 60dB, standard deviation of 9dB. Noise measurements were taken in 2012 (GSWMP ESIA, 2012) knowing that no new activities were created in the region

3.1.6 Metrological Conditions

3.1.6.1 Climate

There are two well-defined seasons in Gaza Strip: the wet season starting in October and extending into April, and the dry season from May to September. Peak months for rainfall are December and January.

3.1.6.2 Temperature

The average daily mean temperature in Southern part of Gaza Strip ranges from 25 ^{0}C in summer to 13 ^{0}C in winter, with the average daily maximum temperature range from 29 ^{0}C to 17 ^{0}C and the minimum temperature range from 21^{0}C to 9 ^{0}C, in summer and winter respectively.

3.1.6.3 Humidity

The daily relative humidity fluctuates between 65% in daytime and 85% at night in summer and between 60% and 80% respectively in winter.

3.1.6.4 Wind

Readings recorded for winds throughout the year by 8 readings per day, at difference of 3 hours between each reading. Average Wind speeds of year 2012 were divided four sections by seasons of the year. Figure (22) shows the average wind speed throughout the months of the year 2012. The Average wind speed in the spring is equal 3.92 m/s and the maximum average wind speed is equal 4.77 m/s in the Marchwe can summarize on a yearly average wind speeds for year 2012 in the Gaza Strip, it is equal 3.75 m/s. (Abu-Zarifa, 2014).

The monthly and annual wind direction in geographical area in year 2012 was common most months of the year, north-west. If we rearrange the wind direction by season, then it will look like this: Spring: The wind direction is common north-west to west-southwest. In the summer is common north-west to west-north west; in the autumn is common north-northwest to north-west and in the winter is common south-west to west- southwest. Therefore the direction and speed of the winds shows that limited smells from the transfer station would affect the residential area located at Tal El Sultan and the east direction of the Transfer station.

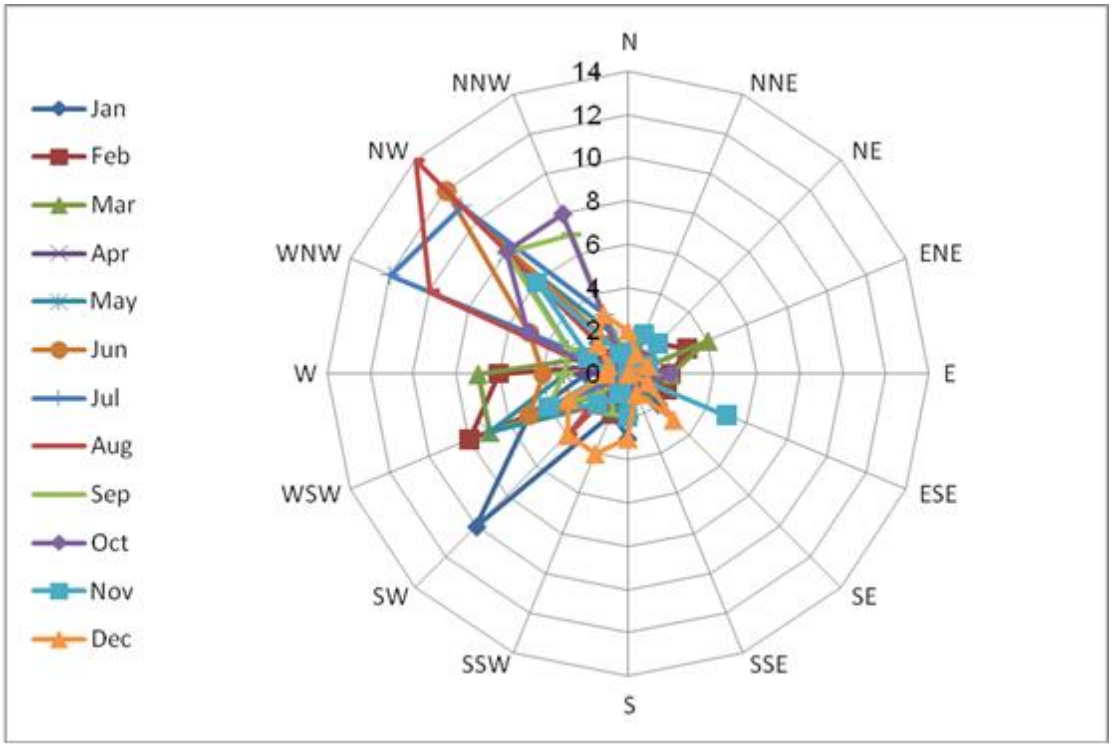


Figure 22. Wind Direction and Speed near the Transfer station site. (Abu-Zarifa, 2014)

3.1.6.5 Precipitation

Rainfall during the season 2015-2016 is 352 mm on average for the whole strip and 236 mm for Rafah Governorate. Rainfall is unevenly distributed and varies considerably by governorates from the North to the South. The average rainfall is interpolated over the period 2015-2016 for 3 stations: Deir Al Balah, Khanyounis and Rafah rainfall stations and the resulted rainfall at the transfer station site is expected to be between 239 to 247 mm as shown in Figure (23).

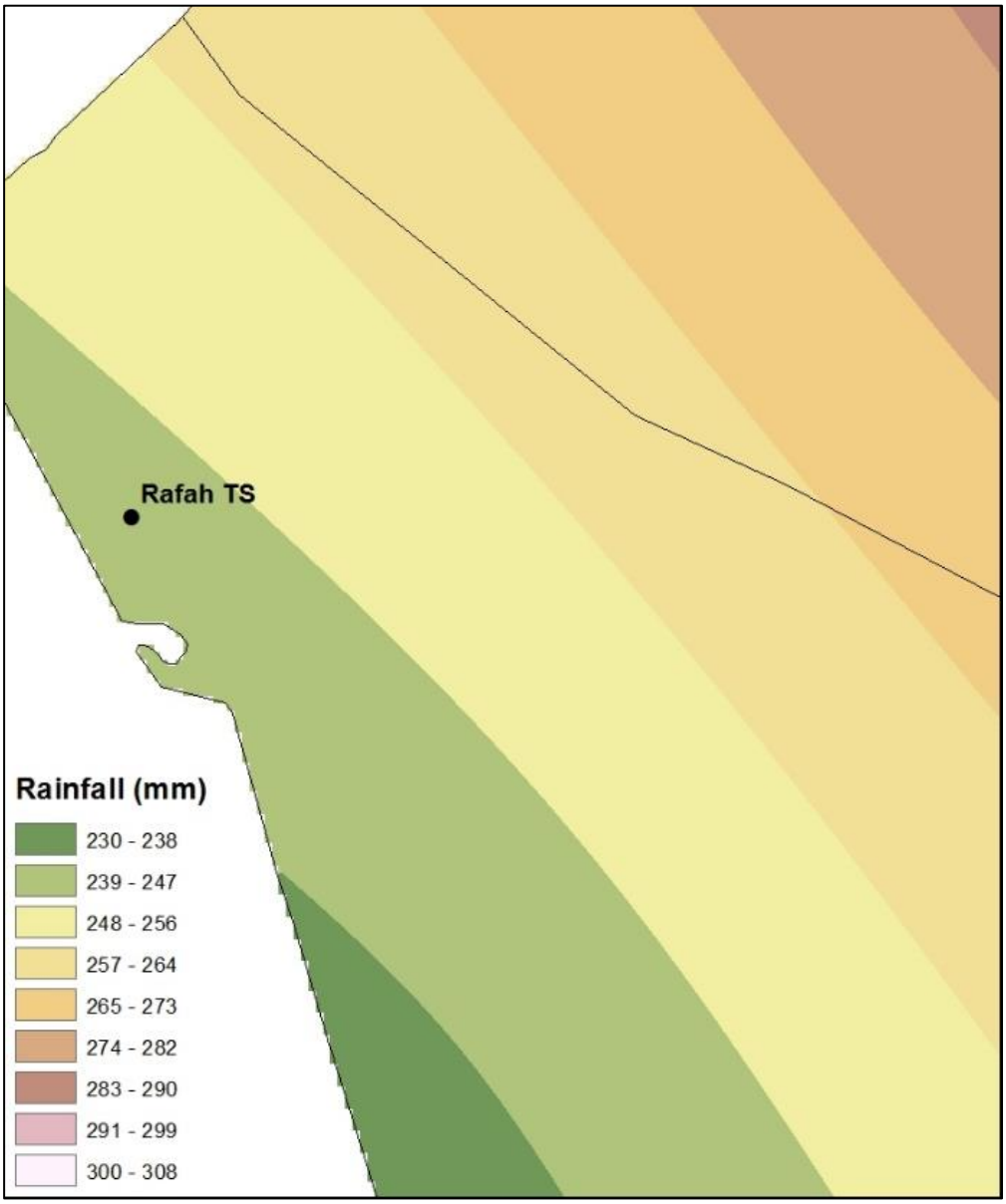


Figure 23. Annual average rainfall data for the year 2015-2016

3.1.7 Land Use and Urban Planning

The land of the transfer station is owned by Municipality of Rafah, the surrounded lands included facilities, such as Sorting Facility and WWTP, also owned by Rafah Municipality and their partners. The access road is leading only to Rafah municipality facilities and it is not used

for people. The access road width is 12m and it is not expected to be expanded during construction or operation of the transfer station. The previous last use of the transfer station land was a temporary storage of waste in emergency cases.

The land use area surrounding Rafah transfer station as follows:

- From East direction is the solid waste sorting facility belong to Palestinian Environment Friends foundation, and the land owned by Rafah Municipality;
- From the West direction is sand dunes which allocate as green area;
- From the North direction is a garden and playground;
- From the South direction is Rafah WWTP.

The region included other industrial facilities such as stone crushers, and some factories in the eastern direction of the TS. The following Figure (24) shows the land use of the surrounding area of Rafah transfer station. Figure (25) shows the general site of the transfer station since this location is already within environmental zone (sewage lagoons and sorting facility), and in as it was preferred in the feasibility study of 2012.

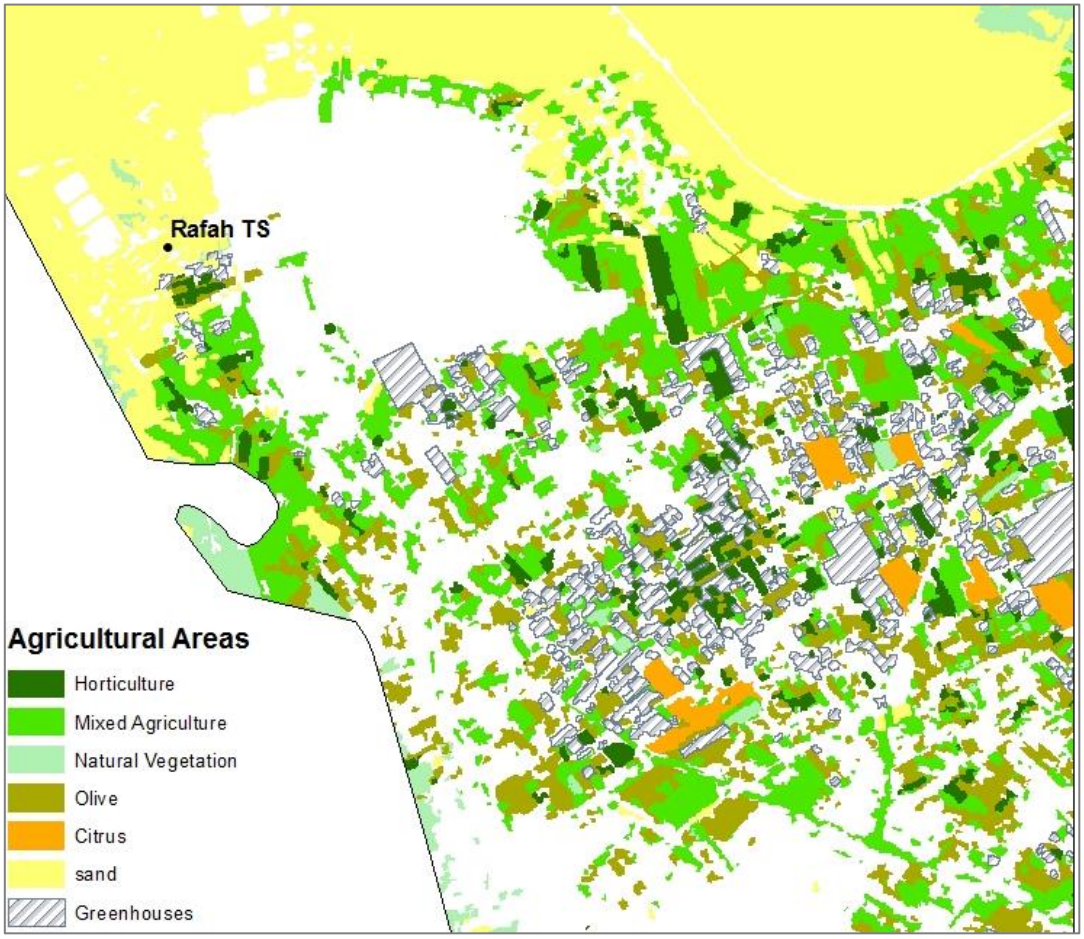


Figure 24. Land use of the surrounding areas of the proposed transfer station (MoA database, 2015)

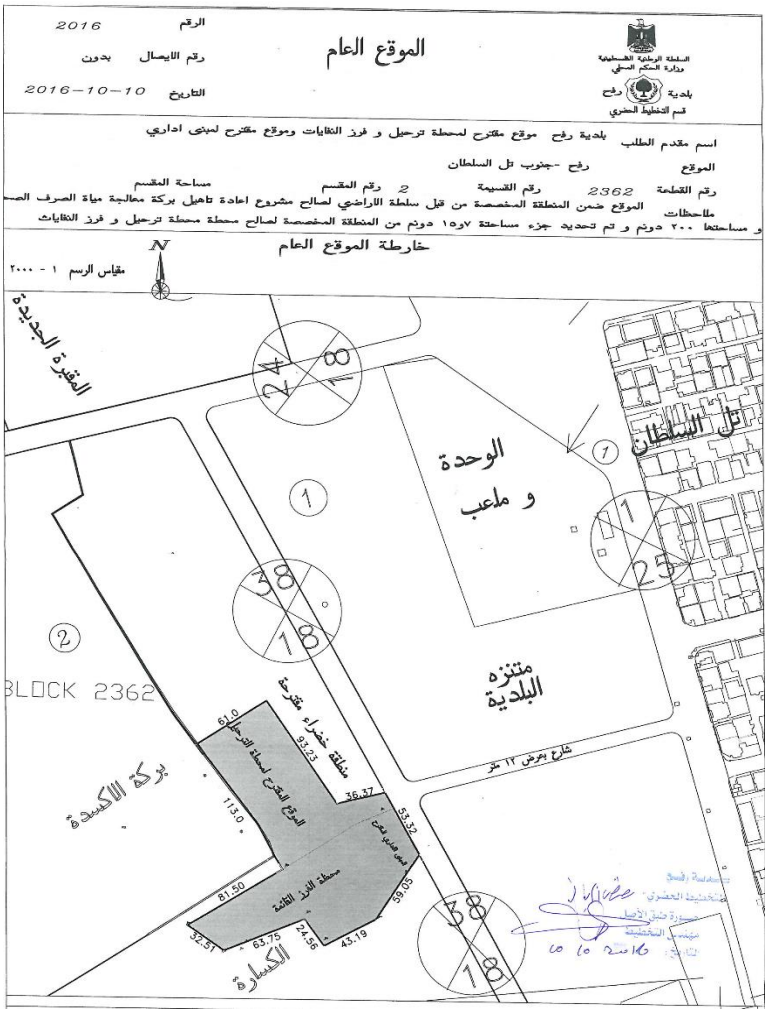


Figure 25. General Site of the proposed transfer station location as approved by Rafah municipality

3.1.8 Roads and Transportation

Access Road to the transfer station area can be considered as low traffic rate taking into consideration that it is the access to municipal facilities only, and it is not used by people. Most of Rafah local roads within the project area are paved, but the access road to the transfer station is not paved. Figure (26) shows the main road that will be used to propose the best route for the Solid Waste vehicles from the Transfer Station to the Landfill, this road is only used for the existing site.

Rafah Transfer station and surrounding lands are owned by Rafah Municipality. The access road is exclusive for municipality facilities only, no expansion is planned for the access road, knowing that a traffic analysis was conducted by the TS designer, and it's found no traffic jam will be witnessed in the access road.

Figure 26. Access Road to Rafah transfer station site

3.2 Biological Environment

3.2.1 Flora

The new transfer station site is located at the existing transfer point, thus the land is mainly covered with solid waste and sand dunes as shown in Figure(27 a.b). The main types of flora and agricultural areas at Rafah Governorate; it is clearly shown that the majority of the surrounding area is sand dunes. Cactus trees, Forest trees, Ficus trees and natural herbs are the typical vegetation found in the site area (Figure 28).

(a) (b)

Figure 27 (a.b). Limited flora witnessed in the current site of the proposed transfer station

Figure 28. Vegetation cover near the site

3.2.2 Fauna

No rare, sensitive or endangered fauna species were observed during the visits to the site and that would be negatively impacted by the construction and operation activities of the landfill. Only wild dogs, rodents and reptiles were observed. The location of the transfer station is within environmental zone (sewage lagoons and sorting facility) as shown in the above Figure (25), and in as it was preferred in the feasibility study of 2012.

3.3 Socio-Economic Aspects

3.3.1 General Population and demographical indicators

The served population by the transfer station is up to 60% of Rafah City. The average House Hold (HH) size is 5 person/HH. It is assumed that the per capita waste will gradually raise to a maximum of 1.05 kg/p/d for all governorates in 2040.

- Actual 2016: 0.75 kg/p/d (210.8 ton)
- Projected 2020: 0.78 kg/p/d (245.1 ton)
- Projected 2030: 1.04 kg/p/d (398.5 ton)
- Projected 2040: 1.05 kg/p/d (463.0 ton)

In 2016, About 233.5 thousand inhabitants are living in Rafah Governorate which consists of three municipalities: Rafah, Al-Naser and Al Shuka. Table (4) shows the population distribution of Rafah Governorate, where 70% of the population are in Rafah City.

Table 4.Population distribution for Rafah Governorate, (PCBS, 2016)

Locality Name	Population	Percentage
Rafah	164,000	70.2%
Rafah Camp	46,541	19.9%
Al-Naser	8,495	3.6%
Al-Shuka	14,453	6.2%
Total Rafah Gov.	233,490	100%

3.3.2 Local economy and services in Rafah

Unemployment continues to increase amongst youth and adults in Rafah; it is estimated that at least 58% of the population does not have a regular source of income. While, donors and civil society actors continue to highlight the plight of the Gaza population in general, funding shortages and lack of viable political solutions has caused fatigue among the international community, especially concerning the Gaza Strip. This has resulted in the serious neglect of key projects including the reconstruction of necessary infrastructure like water, waste and power facilities. Likewise, programs to improve governance, access to basic services, and psychosocial support have also been undermined by shrinking international interest and funding.

The local private sector in Rafah is yet to recover from the losses sustained from the 2014 hostilities, which caused extensive and widespread damage to productive assets, already weakened by the crippling ten-year long blockade. Continuing severe restrictions on imports and exports have driven many out of business, forced others to relocate to neighboring Arab countries, or left those who remain working well below production capacity. Gaza's private sector is isolated from the rest of the State of Palestine and from international markets, seriously reducing its productive capacity.

According to PCBS (2016) results of local economy study showed that there was an increase of those who are working in commerce, restaurants and hotels sector from 19.0% in 4th quarter 2015 to 22.2% in the 1st quarter 2016, and a decrease in the percentage of those who worked at transportation, storage and communication sector from 7.9% to 6.2% at the same period. On the other hand the results showed that the percentage of employed persons at services and other branches sector reached 52.0% in Rafah in the 1st quarter 2016.

3.3.3 Current and Future *Waste Generation*

According to Rafah Municipality, the actual daily collected Quantities is 184 m^3 daily (about 92 ton). Other weight estimated current quantities about 120 ton/day. The future quantities for the year 2040 are estimated to be 60% of 463.0 ton = 278 ton.

3.3.4 Solid Waste Composition

According to the study implemented by Environmental Friends Society in 2012 for solid waste composition at Rafah City, the organic solid waste constitutes (on average) 65% of the total solid waste composition, as shown in Figure (29) below.

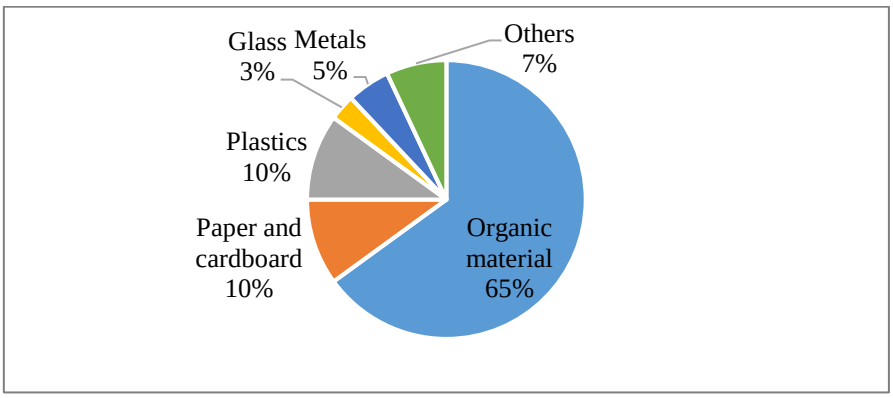


Figure 29. Composition of solid waste fractions and average percentage in Rafah governorate, (EFS,2012)

3.3.5 Generation Quantities and Transportation of Waste Materials

Referring to the information provided by Rafah municipality, in Rafah City four vehicles are basically used in the collection process, two tractors, a pickup (4 cubic meters) and one compactor vehicle (10 cubic meters). These vehicles collected waste bags from front of houses and transported them directly to the dumpsite. No available information or records are accessible about the exact produced municipal solid waste quantity in Rafah City. Recently Rafah has 3 types of collection system. First is done by compactor truck where the car pass daily in streets to collects garbage bags from front of buildings. Second done by hook lift containers where donkey carts collect from houses and through waste in these containers to be removed later by hook lift truck. Third done by tractor and trailer where it passes through rural and unpaved areas to collect bags from houses. Containers and street bins are not common in Rafah as other municipalities. The municipality officials are not pleased with donkey carts, and require to be replaced, same time they have a problem of getting garbage bags all day long causing stream of garbage bags along main streets on both sides and in the middle pedestrian. One of the main problems is the condition of dumpsite (Sofa) where the excessive height and bad condition damage equipment and waste a lot of time for equipment. The different vehicles types used in Rafah and solid waste estimated quantities collected and transferred are shown in table (5), where compactor represents 30% of total equipment.

Table 5.Total trips, total SW transported quantity for the year 2000 of the different types of vehicles with relation to the cost

#	Vehicle type	Model Year	Trip /day	Collection waste ton /day	Collection waste per ton /year
1	DAF-PF183M	2000	1	15	4350
2	DAF	2004	1	13	3770
3	DAF-CF75/1259	2001	1	10	2900
4	Iveco-H03E091	1999	1	10	2900
5	IsozoNPR	1995	1	4	1160
6	Renault -280DXT	2008	2	20	5800
7	Mercedes	1996	2	14	4060
8	Volvo-FH12	2002/08	4	56	16240
9	Volvo-FH12	2002/08	4	60	17400
10	Mercedes	1994	4	16	4640
11	DAF	1998	4	60	17400
12	Volvo-F12	1993	4	60	17400
13	Massy Firgson	1995	2	6	1740
14	Massy Firgson	1996	2	6	1740
15	Massy Firgson	1995	2	6	1740
16	FIAT	2000	2	6	1740
17	Caterpillar 950G	2005	0	0	0
18	Caterpillar 950G	1987	0	0	0
19	Pop cat	2000	0	0	0
Total (Ton/year)					104980

From previous and recent data, the efficiency in relation to the effective cost of the transfer and transport of waste in the year 2000 and 2016 can be concluded. The two tipper vehicles (Mer Dump Truck 1928 and the Inter Dump Truck) beside the UNRWA trucks have the highest transportation efficiency. The two tractors, Nissan Dump Car and Eveco-Rafah have the lowest transport capacity and economic efficiency. So, it is recommended to use the tipper vehicles sty for transport and to avoid the tractors and small volume vehicle.

3.3.6 Solid Waste Collection Costs

The Municipality of Rafah offers SW collection services for an area of 40 square kilometers. The area is geographically divided into three main collection sections, Western, Central and Easter Section. The collection techniques are differing from area to area and according to the different types of waste materials.

The waste collection process is considered one of the most costly in the stages of solid waste management. However, no exact new data ii available. Based on data calculated in year 2000, the employment cost makes 90% of the total collection cost as presented in table (6).

Table 6. Summary of the total annual cost of the existing collection process

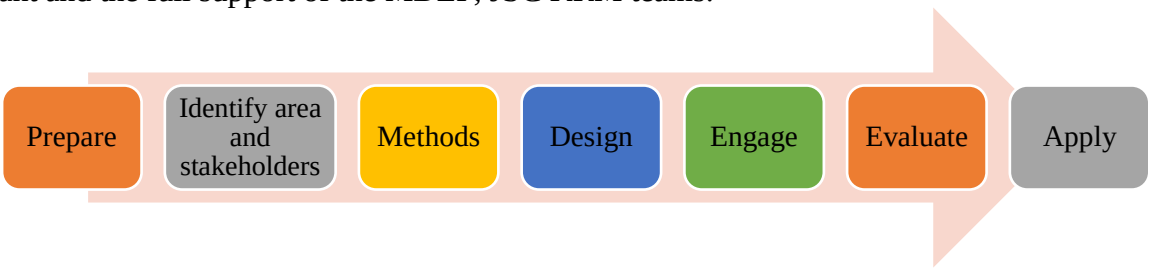
Type	Total Annual Cost ($)	%
Employment cost	243,620	90.46
Personal equipment and tools	2,480	0.92
Basic collection vehicles and tools	23,220	8.62
Total	269,320	100

Source: Afifi (2000)

4. STAKEHOLDER ENGAGEMENT

Public participation and consultation is an integral part of environmental and social management plan (ESMP) polices overall the words. The comprehensive stakeholder engagement in the early stage of projects allows the effective identification, assessment, and management of any environmental and social risks in advance. The public consultation and participation facilitate adequate public input for identifying issues, evaluating their significance and for deciding measures to avoid or mitigate impacts. It gathers support for the project and increase comfort level of decision makers. At the same time, the interested stakeholders are taking into account throughout the project lifecycle. Early involving of the public in the ESMP can result in several positive outcomes: public is better informed about the project proposal; different viewpoints of the project are brought forward early in the planning phase; issues and concerns can be analyzed and evaluated; and potential points of disagreement between parties are identified and considered. In the other side, public participation requires building partnerships between the public, the proponent, governments and other organizations related to the plan activities. The adequate public input into the decision making process raises the level of comfort of decision makers.

The following chart summarizes the social engagement process that undertaken by the consultant and the full support of the MDLF, JSC KRM teams:



The main activities to ensure an adequate stakeholders engagement include but not limited to the following activities:

- Field Visits to the project area;
- Using Social survey Questionnaire for the affected communities and potentially affected communities (around 100 questionnaires);
- Identify and engage with stakeholders, using participatory approach applied in the engagement with project-affected individuals, communities, as well as other relevant stakeholders;
- Documentation of information (by reports, documents, photos, video, etc.);
- Organize stakeholder information and participation workshop where the project is presented to the Rafah community and there are opportunities for them to analyze it, raise their concerns, and participate in the proposal of mitigation measures. This workshop is carried out in adequate venues.

4.1 Questionnaire to the local communities at the project areas

Around 100 questionnaires were distributed to the residents around the project area in Rafah. The questionnaire contains five parts including: general information about the residents, waste collection, transfer station, air quality, transportation and public health. The results of the questionnaire were as follows:

4.1.1 Geographical Distribution of Respondents

The geographical distribution of respondents (100 respondents) was mostly within the radius of 500m from the transfer station, knowing that the nearest residential area is far about 350m from the transfer station. Figure (30) shows that around 45.7 % of respondents live near the transfer station at a distance less than 500 m and about 21.7% of them live besides the roads that lead to the transfer station.

Most of the families (72.8%) are considered as large families with more than 6 persons and 20.7% of the families had more than 10 persons. These figures are consistent with the normal distribution of the families in all over Gaza strip as shown in Figure (31).

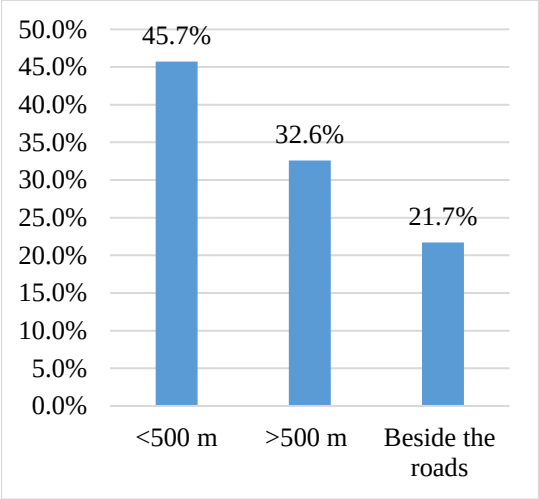


Figure 30.Geographical Distribution of Respondents

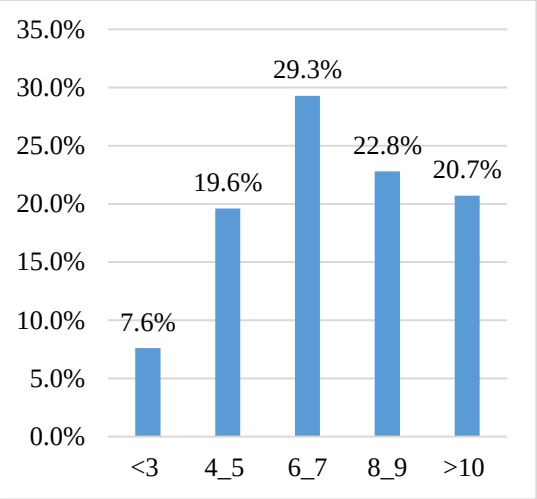


Figure 31.Family member of the residents near Transfer Station.

The respondents were distributed to all age groups youth and old persons living in less than one kilometer from the transfer station. Social survey targeted men and women above 16 years old. Around 17.4% of the participants are below 30 years old while 39.2% of them are older and between 30-50 years old. The gender distribution had been taken into consideration; however, around 52.2% of participants are males while 47.8% of them are females, which reflect the strong women participation in this questionnaire as shown in Figures (32, 33).

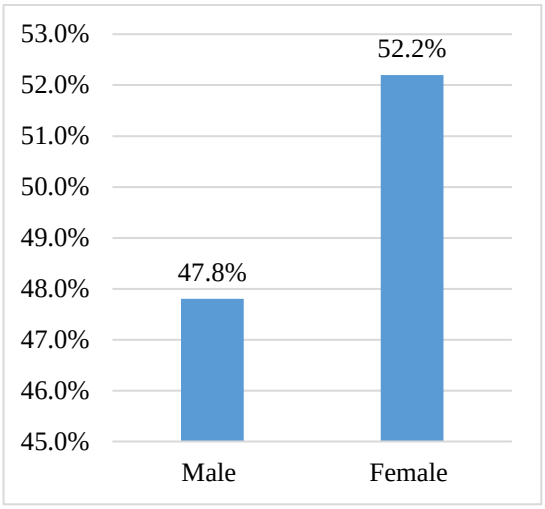


Figure 32. Gender among the local communities

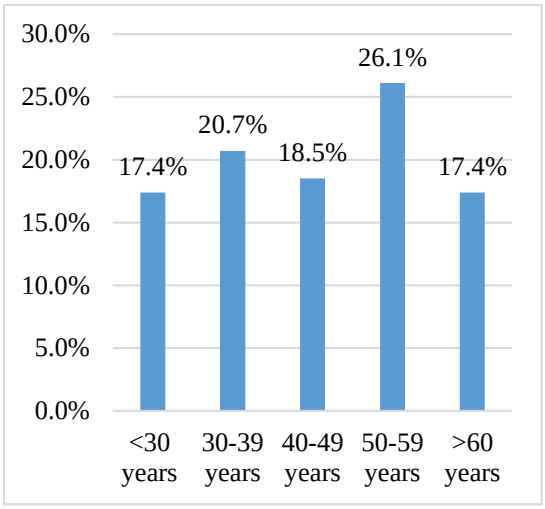


Figure 33. Age distribution among the local communities participated in the questionnaire

4.1.2 Employment rates

Figure (34) shows that around 60% of the local communities are unemployed in any sectors while around 27.2%of them were employee at governmental and private sector while 13% working in agriculture. However, most of them described their living conditions as moderate to good living conditions, around 72.8%. This means that the families surrounding the transfer station are in good living conditions despite of the high unemployment rate as shown in Figure (35).

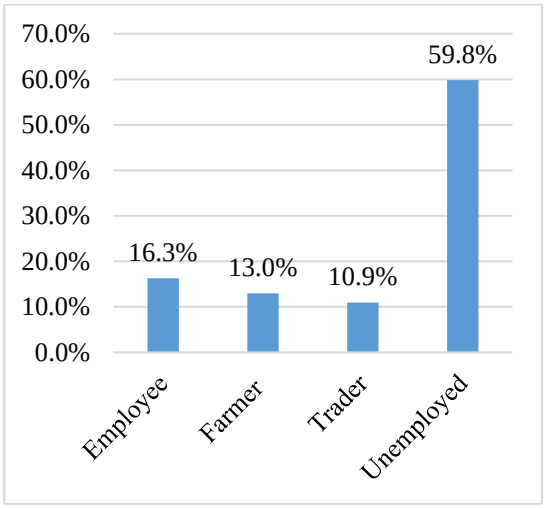


Figure 34. Employment sectors of the local communities participated in the questionnaire

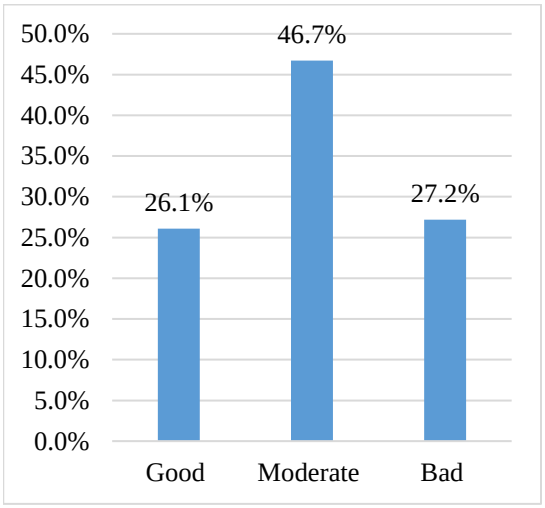


Figure 35. Living Conditions of the local communities

4.1.3 Solid Wastes Collection

Most of the residents living near Rafah transfer station (75%) are served by house-to-house collection system and only 25% use the municipal containers as shown in Figure (36). However, 94.6% of residents who use the containers have objections about insufficient number and proximate distance of the containers in their area and asking for more containers that could be close to their neighborhood (Figure 37).

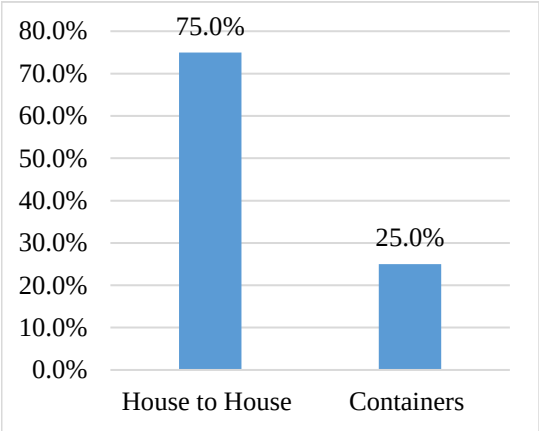


Figure 36. Waste Containers Availability near to the local community's houses participated in the questionnaire

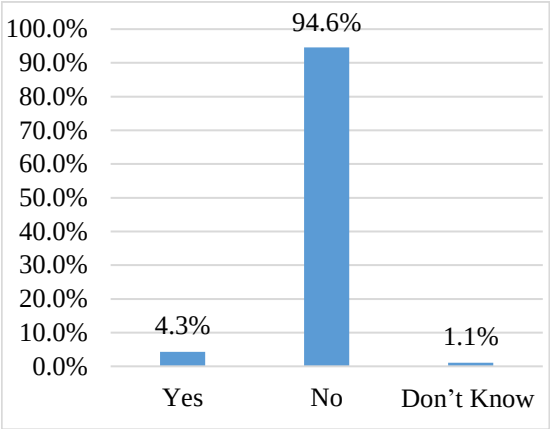


Figure 37. Is the available Solid waste containers are close to your house?

4.1.4 Resident satisfaction

Figure (38) shows that only 28.3% of the residents revealed that there are problems between the neighbors because of solid waste collection system. This refers to the limited number of solid waste containers that creates problems among the residents.

Figure (39) shows that about 57.6% of the population living near the transfer station revealed that they are served regularly by the municipality for solid waste collection. While 41.3% are not serviced regularly. This make some residents reluctant to accept the establishing of the transfer station while they are not benefited from the municipal services.

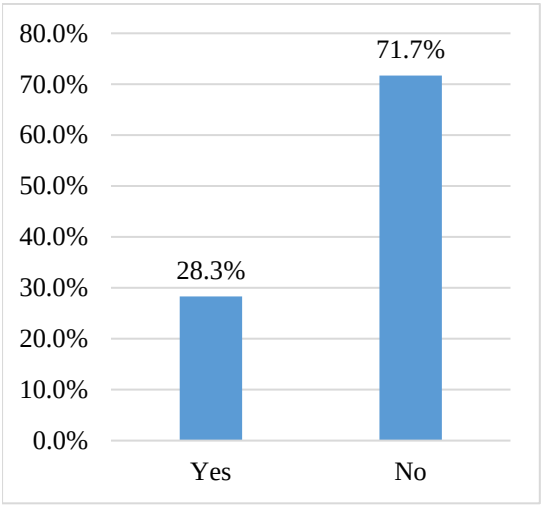


Figure 38.Is There are any problems between the neighbors because of solid waste

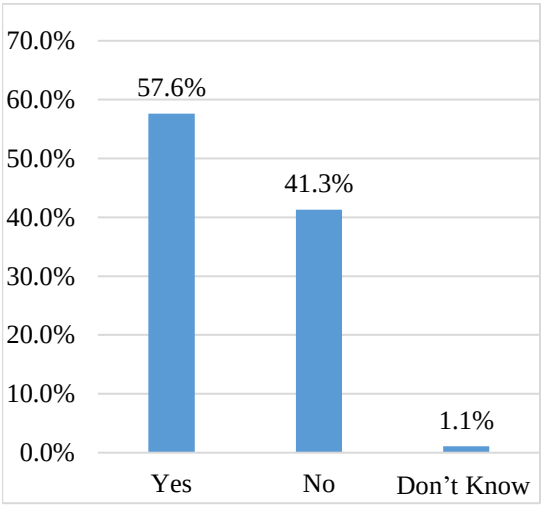


Figure 39. Does the municipal collect wastes on a regular basis

Figure (40) shows that 50% of residents are satisfied for the municipal services and they describe it by "good" and the second half are not satisfied. Most of the residents (74%) know about the final disposal of their solid waste (Figure 41). They had good knowledge about solid waste management process and know how the solid waste are transferred from their houses to the transfer station and then transported to the Al Fukhary landfill. This good knowledge could support the project implementation and operation.

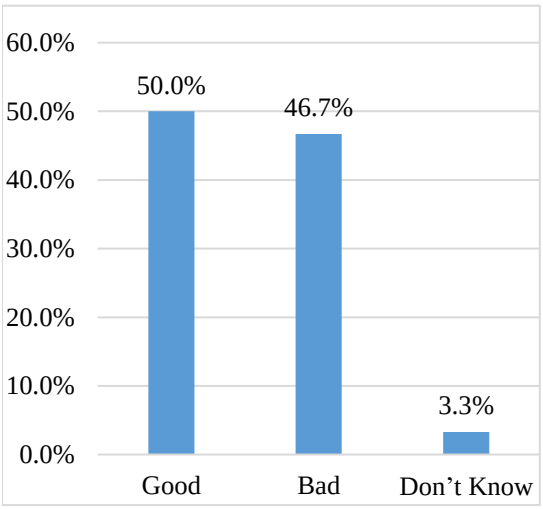


Figure 40. Evaluation of the Municipal Waste Collection System

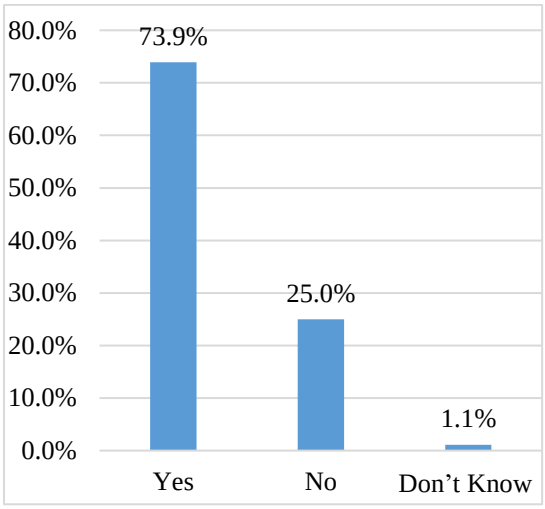


Figure 41. Knowledge of the residents about final disposal of the solid waste

Figures (42) and (43) show that the majority of the local communities, about 85%, had previous information about establishing or rehabilitation of Rafah transfer station at the existing transfer point. However most of the surveyed sample (86%) did not agree on having transfer station near to their neighborhood. Some of the residents could change their minds and agree on establishing the transfer station under a condition of improving the solid waste collection system at their neighborhood and implementing visual and safety mitigation measures to decrease the impacts on their area. Only 13% accepted the establishments of the transfer station, most of them are living within a significant distance to the site where limited impacts could affect them.

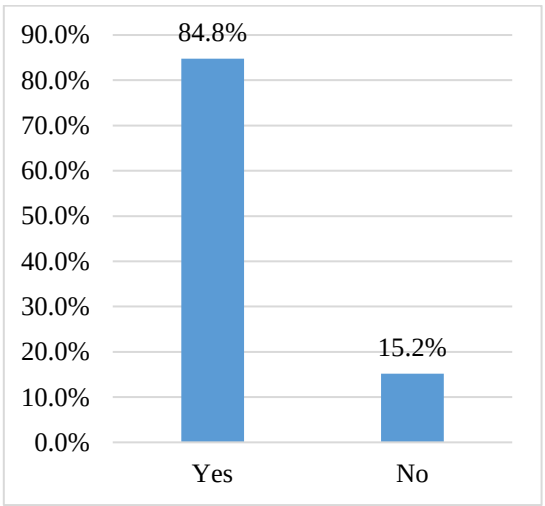


Figure 42. local communities had learnt about Rafah transfer station

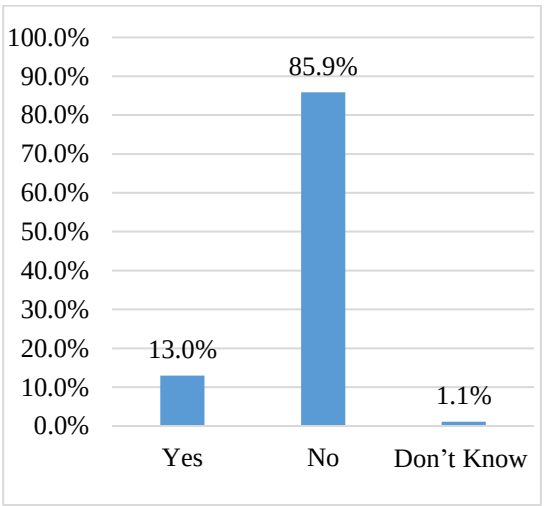


Figure 43. local communities agreement of establishing transfer station

In order to increase the acceptance percentage, Primary Waste Collection study is currently underway to assessed the current primary collection services in Gaza Strip. The study aims to provide recommendations and solutions for increasing the areas where the collection services need to be strengthened with focusing on the regions of new transfer stations including Rafah transfer station, thus the surrounding area will be connected by the waste collection service

area where the solid waste primary collection will be improved. JSC-KRM will be working closely with the municipalities to ensure that this concern in addressed in a satisfactory manner. In the meantime, further community engagement and consultations activities will be targeting the neighboring communities and will be moderated by JSC. The results of the consultations should inform the process of the primary waste collection improvement.

4.1.5 Positive and negative impacts of the transfer stations

Figures (44) and Figure (45) show that the majority of the local residents did not see any positive impacts of establishing transfer station at their neighborhood. This high percentage do not have an idea about the shape and design of the new transfer station and they revealed that no one came to clarify the purpose of this transfer station and they have little information about it. Among the negative impacts mentioned by the local residents the transfer station might have bad smells, spreading flies and mosquitos, accumulation with large amount of solid waste. The local residents are afraid that these issues may affect their health and welfare.

However there are 14.1% of the local residents understand that there is positive impacts which could be: create jobs and reduce garbage that randomly disposed in the area.

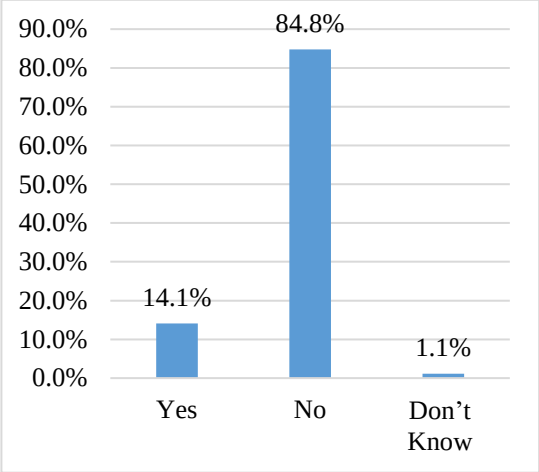


Figure 44. Is there any positive impacts of establishing Solid waste transfer station

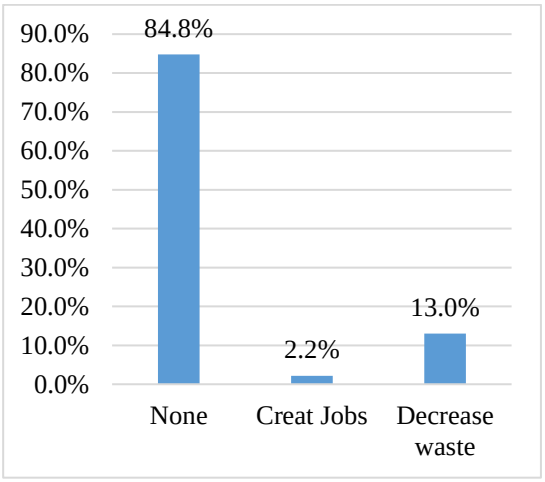


Figure 45. What are the positive impacts of establishing Solid waste transfer station

Figure (46) shows that around 86% of the residents confirmed that there are bad smells from different sites near the transfer station. The sources of these smells are mainly from the existing random solid waste site and the wastewater treatment plant. Most of the people confirmed that these smells are spread at evening. This might happened because of direct of the winds at these times from western direction. While Figure (47) shows 14.1% of them who are living away from the transfer station sites confirmed that there is no bad smells reached their neighborhood.

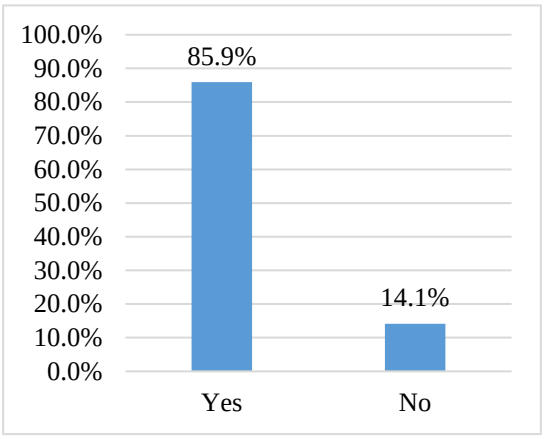


Figure 46. Is there any bad smells in the area

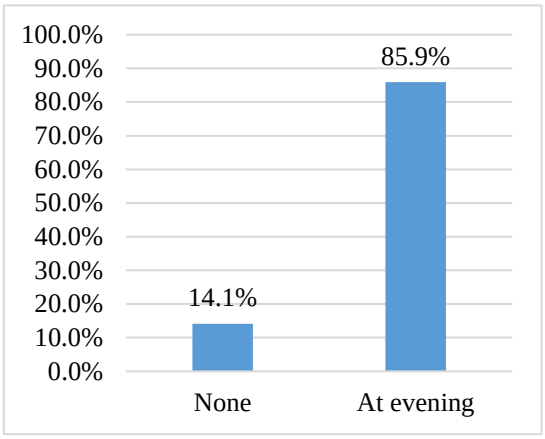


Figure 47. which time you are feeling with bad smells

Figure (48) shows that the majority of the local residents (68.5%) are not suffering from dusts that bothering them during day time. However, about 30% of residents who suffer from dust said that the transfer station vehicles are the main source of dust. It is clear within the consultant's site visits that some of the roads are unpaved which caused dust during traffic movements in addition to the activities of the factories in the nearby areas. Other sources of dust caused by wind since the southern parts of the area consist of sand dunes especially during windy days at summer time.

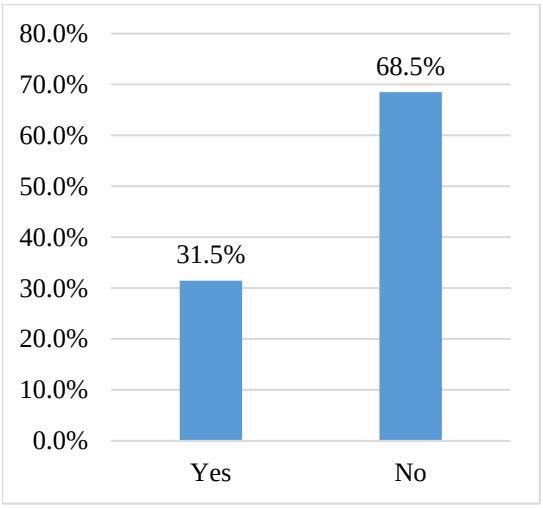


Figure 48. Is there any dust at air in your neighborhood

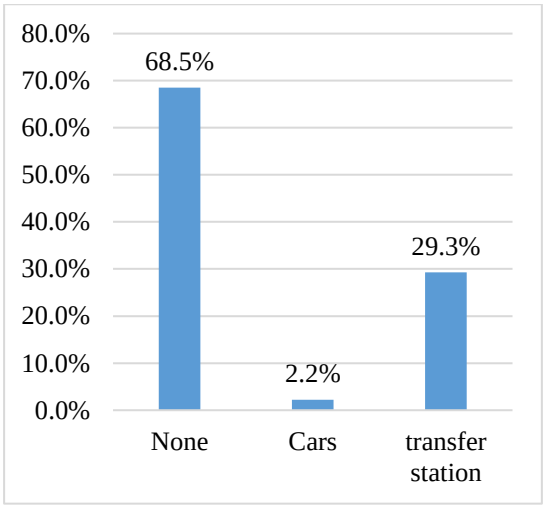


Figure 49. The sources of dust

Majority of residents living close to the transfer station (about 85%) are neither suffering from traffic jam nor from noise emissions due to trucks movement (79.3%) (As shown in Figures 50 and 51 below, and around 20.7% of them confirmed that the traffic jam happened during the day time due to movement of many vehicles on Abu Baker Street (Figure 51). While (77%) did not expect to increase the noise due to the SW trucks movement as shown in Figure (53)

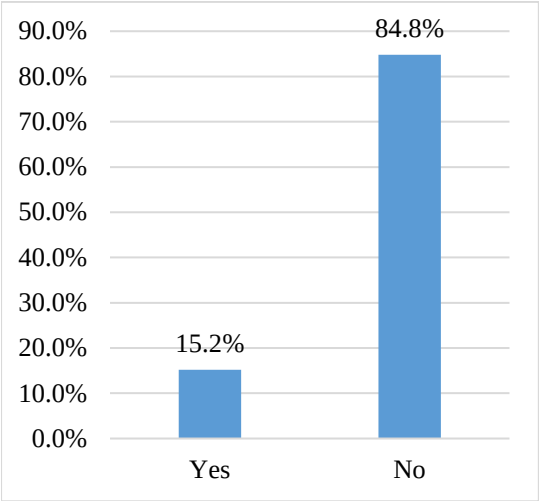


Figure 50. Traffic jam in the area

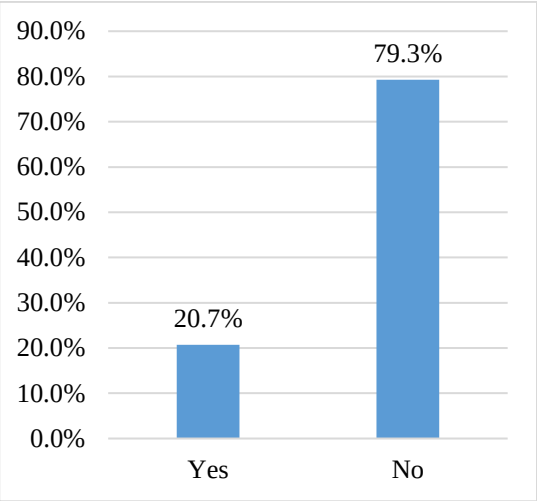


Figure 51. Expectation of increasing traffic accidents in the area as a result of SW vehicles

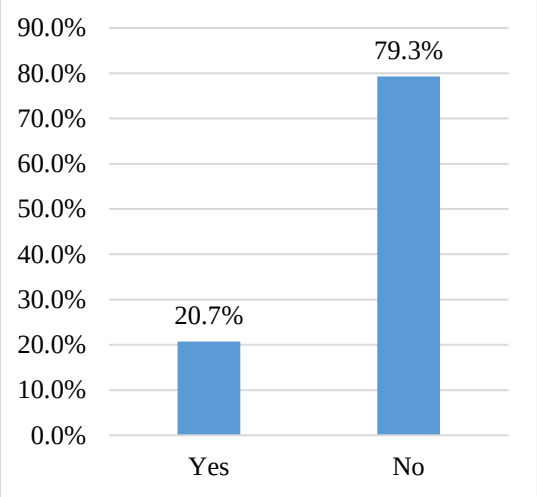


Figure 52. Residents suffering from noise

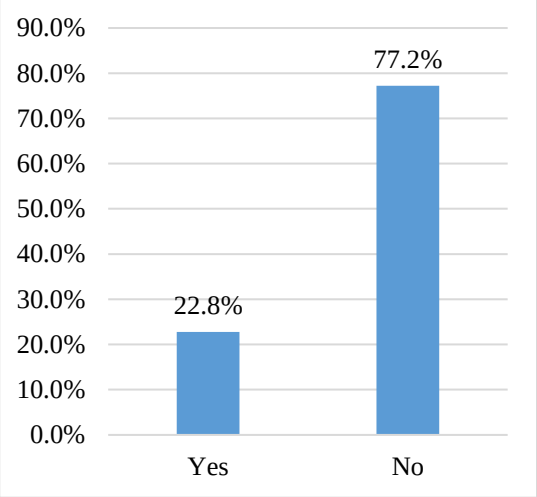


Figure 53. Expectation of increasing noise and emissions from SW vehicle movement

All local residents are suffering from existence of flies and rodents. Due to many reasons, mainly from the existence of solid waste transfer point and wastewater treatment plant ponds. This problem disturbs the people's daily life and affecting their public health. All people confirmed that there are limited efforts made to control the flies and rodents in their areas, only 17.4% reveal that there are some control measures from the municipality as shown in Figure (55).

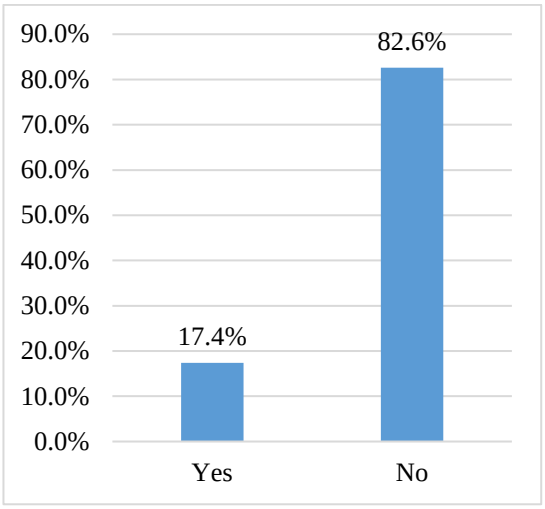


Figure 54. Municipal efforts to control the flies

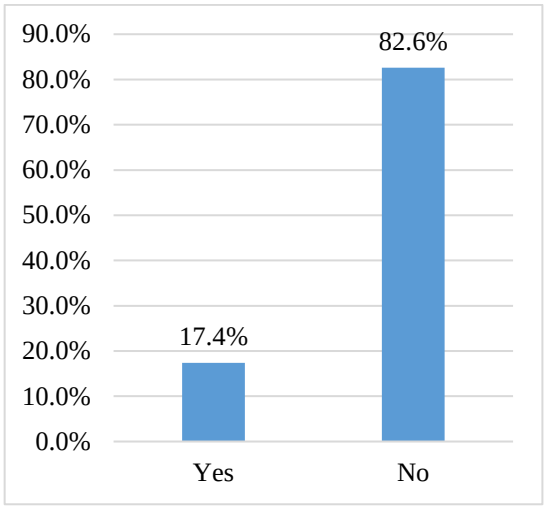


Figure 55. Municipal efforts to control the rodents

4.1.6 Public Health

The questionnaire results indicate good public health regarding respiratory or skin diseases. Figure (56) shows that the only 16.3% of residents in Rafah Transfer Station area are suffering from any respiratory or skin disease.

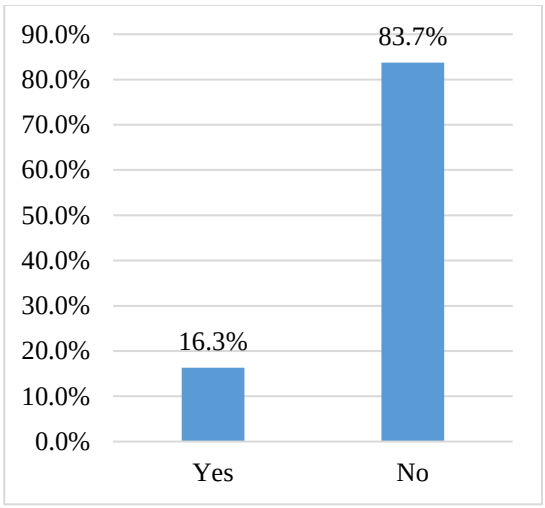


Figure 56. Residents suffering from respiratory or skin disease

4.2 Consultation Workshop with Local Communities

On 27 November 2016 the consultant in coordination with MDLF, JSC KRM and Rafah municipality conducted a consultation workshop (Figure 57). The workshop attended by representatives of Rafah Municipality, local community members, local NGOs, MDLF staff, JSC KRM staff, UNRWA, Ministry of local government and academic representatives. See Annex (2) the list of participants. The design consultant presented the components of the transfer station including associated facilities, transportation inside the site, and elements of the transfer station.

The ESMP presented the following issues:

- Conditions of project approval;
- The impacts within predicted or permitted limits;

- Action to manage unanticipated impacts;
- Ensure maximum environmental benefits;
- Learn from experience in order to improve ESIA process and practice;
- What is required? Identify the scope and components of the programme;
- Who will carry out the activities? Indicate the roles and responsibilities of key agencies and individuals;
- How will the programme be carried out? Specify the resources, expertise and arrangements necessary to give effect to ESIA follow up, and report results.

The participants had been divided into five discussion groups, each group discussed one theme and agreed on the possible impacts, mitigation measures, Monitoring procedures, and responsible bodies. The five thematic groups are:

- Group 1: Public health;
- Group 2: Water;
- Group 3: Roads and Transportation;
- Group 4: Soil;
- Group 5 Air pollution and Noise.

The results of the workshop presented in the following Scoping matrices:

Group 1: Public Health and Workers Safety			
Construction phase			
Impacts	**Mitigation**	**Monitoring**	**Responsible party**
• The dust from construction works. • Pollution from traffic during construction works. • Noise from construction works. • Waste Accumulation.	• Reduce the implementation period. • Temporary plan for non-accumulation of waste. • Closing the area with a fence. • Workers to comply with wearing the protective equipment.	• Regular monitoring of dust, and noise by using specific equipment. • Workers compliance of wearing the protective equipment	• The Contractor • Rafah Municipality • JSC KRM • MDLF
Operational phase			
Impacts	**Mitigation**	**Monitoring**	**Responsible party**
• Odor • Insects • Rodents • Gases • Stray Dogs • Dirt, dust • Epidemics diseases (Chest, skin, eye) • Water Pollution • injuries	• Periodically checks for workers • Continuous deportation of waste • Insect and rodent control • Workers to comply with wearing the protective equipment.	• Regular monitoring of odor, insects, rodents, and stray dogs. • Workers compliance of wearing the protective equipment	• The Contractor • Rafah Municipality • JSC KRM • MDLF

Group 2: Water			
Construction phase			
Impacts	**Mitigation**	**Monitoring**	**Responsible party**
• Pollution of groundwater from existing leachate. • Pollution of groundwater.	• Accelerate the transfer of the existing solid waste.	• Regular Monitoring the groundwater pollution	• The Contractor • Rafah Municipality • JSC KRM • MDLF
Operational phase			
Impacts	**Mitigation**	**Monitoring**	**Responsible party**
• Pollution of groundwater from the leachate tank leakage	• Avoid any leakage at the leachate pond by using isolation of the pond's walls and ground slab. • Efficient collection and drainage system of the water used during vehicle's washing.	• Monitor and inspection of the leachate pond against any leakage. • Monitor the drainage of water used during vehicle's washing.	• Rafah Municipality • JSC KRM • MDLF

Group 3: Roads and Transportation			
During the construction phase			
No traffic impacts are expected during the construction of the transfer station due to the following reasons: - The required construction vehicles are very limited, and used in limited time of the construction period (in backfilling period); - The construction site is far from the residential area; - The access road to the construction site is used for municipal facilities only; - The transported materials will be imported in limited time.			
During the operational phase			
Potential impact	Mitigation measures	Monitoring	Responsible Authority
• Dusts results from the trucks movement.	• Use paved roads • Determine the speed of vehicles	• Ensure road safety and its cleanliness • Monitor the speed of vehicles by using GPS	• Rafah Municipality • JSC KRM • MDLF
• Noise result from the vehicles during transferring the solid waste	• Determine Working time during the day. • Organizing receiving and deportation of waste to and from the station to fade the congestion that causes noise. • Regular Vehicle maintenance	• Identify clear work plan and specific dates for the start of the combination receive and transfer of waste to avoid congestion at the same time. • Determine periodic maintenance plan	• Rafah Municipality • JSC KRM • MDLF
• Traffic jam	• Determining a vehicle line is far from the traffic congestion (TS – Saudi neighborhood – Al-Muharrarat route – Miraje crossroads – Al Nasr Neighborhood – Sofa	• Monitor the speed of vehicles. • Monitor the Working time • Use traffic signals • Being Away from peak times	• Rafah Municipality • JSC KRM • MDLF

	Landfill) knowing that all these streets are paved and have very light use. No extensions of the street width will be carried out. • Stay away from peak times and coordination with the Ministry of Transportation.		
• Waste Blowing Out from the Vehicle and Odor	• Cover the trucks that carry wastes • Wash the vehicles	• Develop a plan to monitor the Vehicles through surveillance cameras • Accept complaints from the population	• Rafah Municipality • JSC KRM • MDLF
• Pollution during evacuation of Leachate	• Provide the vehicles with tanks to collect the leachate	• Monitor the tanks	• Rafah Municipality • JSC KRM • MDLF

Group 4: Soil			
During Construction phase			
impacts	**Mitigation**	**Monitoring**	**Responsible party**
• Landslides (basin area) during the drilling process.	• Ensure the cohesion of the soil during excavation and construction	• Monitor the excavation activities.	• Rafah Municipality • The Contractor • MDLF
• The mixing of waste during construction	• Remove the solid waste before any construction works.	• Monitor the removal and transferring the existing solid waste.	• Rafah Municipality • The Contractor • MDLF
• Oils spills resulting from heavy machinery	• Regular maintenance and prevent oil spills.	• Monitor the oil spills.	• Rafah Municipality • The Contractor • MDLF
During Operational phase			
impacts	**Mitigation**	**Monitoring**	**Responsible party**
• Soil Erosion	• Wall of trees (green belt)	• Monitor soil erosion and fencing.	• Rafah Municipality • JSC KRM • MDLF
• Leakage of leachate into the soil	• Padded flooring in the accumulation of waste or transport areas	• Monitor any leakage at the leachate pond.	• Rafah Municipality • JSC KRM • MDLF
• Collapses (waste water basins)	• Sufficient distance between the work area and the basins of wastewater	• Monitor the neighboring wastewater lagoons.	• Rafah Municipality • JSC KRM • CMWU • MDLF

Group 5: Noise and Air Pollution			
At the construction phase			
Potential impact	**Mitigation measures**	**Monitoring Programs**	**Responsible Authority**
• Noise due to Constructions.	• Use paved roads	• A permanent and regular supervision, inspection	• Municipal

	• Determine the speed of vehicles • Determine Working time during the day	and monitoring of all construction activities.	• Operator • MDLF
• Dust and air pollution	• Use paved roads • Determine Working time during the day • Cover the trucks that carry wastes.		
• Construction Wastes	• Prevent waste burning • Collect wastes and carry it to landfill		
At the operational phase			
Potential impact	Mitigation measures	Monitoring Programs	Responsible Authority
• Dusts results from the trucks.	• Use paved roads • Determine the speed of vehicles.	• Ensure road safety and its cleanliness • Monitor the speed of vehicles by using GPS	• Municipal • Operator • MDLF
• Noise result from the vehicles	• Determine Working time during the day. • Vehicle maintenance.	• Monitor the Working time • Monitor Vehicle maintenance	

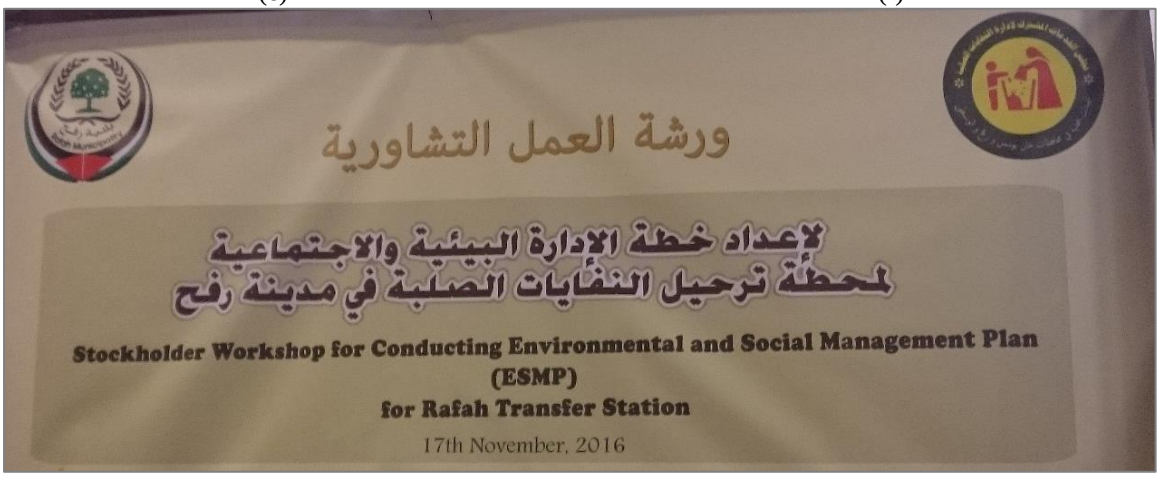
(a)

(b)

(c)

(d)

(e) (f)



(g)

Figure 57 (a-g). Photos of the consultation workshop with the local communities and stakeholders

5. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS DURING CONSTRUCTION AND OPERATION PHASES

5.1 Methodology

The prediction of environmental, social and health impact assessment was based on identification of impacts and risks in relation to operation activities and sensitivity of the receiving environment. The key physical, biological, socioeconomic and human valued receptors were identified. The potential positive and negative changes resulting from the defined project activities are then described using an impact identification matrix through which aspects and factors are correlated to find interactions that would potentially result in impacts. The predicted impacts are then evaluated using a significance ranking process based on the importance of the impact. Each valued receptor was categorised in terms of its perceived environmental, social and health value.

The impact significance is used to determine whether the impacts are low, medium, high or no impacts is associated. The following categories are assigned to impacts magnitude and the impacts time scale based on the following:

- Time scale:
  1. Short term ($\leq$ 1 month)
  2. Medium Term (1 month $\leq$ duration $\leq$ 1 year)
  3. Long term (more than 2 years)
- Magnitude:
  1. Low: the impacts have low effects on the physical, biological, socioeconomic and health.
  2. Medium: the impacts have limited effects on the physical, biological, socioeconomic and health.
  3. High: the impacts have severe and significant effects on the physical environment, biological, socioeconomic and health.

Table 7. Potential Environmental and Social Impacts during Construction phase.

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS DURING CONSTRUCTION PHASE			
Potential Impact	Description	Timescale	Magnitude
Physical Environment			
Soil	- Soil pollution because of the existing accumulated waste at the transfer station site.	Short term	Medium
Surface water and Groundwater	- Impacts on water quality due to the existing solid waste that may lead to pollutant spillages during excavation and construction.	Short term	Low
Noise emissions	- Increasing noise emissions due to construction work and excavation. - Movement of trucks carrying excavated soil and trucks bringing construction materials to the site.	Short term	Low
Ambient air quality	- Dust emissions from construction and excavation works. - Affecting air quality by vehicles and equipment emissions. - Action of the wind on the existing accumulated solid waste and the stored construction materials;	Short term	Medium
Odor	- Transferring the accumulated wastes at the existing transfer point may result in increasing the odor impacts. - Existing leachate quantities may increase the odor impacts.	Short term	Medium
Handling of hazardous materials and waste	- Mainly handling and storage of oils and fuels for equipment.	Short term	low
Economic Issues			
Direct employment and income	- Construction will create about 60 new jobs. - Purchase of limited quantities of construction material and rent of construction equipment.	Short term	Medium
Transportation and Traffic	- Disruption of traffic movement on the main roads. - Increase the probability of accidents	Short term	Low

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS DURING CONSTRUCTION PHASE			
Potential Impact	Description	Timescale	Magnitude
Municipal expenditure /revenues	- The transfer stations will minimize the cost of transporting the solid waste to the landfill.	Short term	Medium
Indirect/induced economic development	- Indirect economic development may be effected as: - The construction phase is expected to have limited negative effects on industrial, residential and commercial development. - In addition to that some positive effects are expected in the reuse and recycle of solid waste and composting activities.	Short term	No effects
Social Elements			
Demographic change	- The demographic change in the area have limited effects due to the construction of the transfer station	Short term	Limited
Transportation and traffic	- Limited increase of traffic volume by transfer trucks in Tal Al Sultan Area due to the construction and excavation equipment.	short term	Medium
Social support	- The surrounding community will have some concerns if the improper management of the construction activities.	Short term	Medium
Human Health			
Local community health	- Direct impact from dust resulted from movement of heavy machinery and construction works. - Nuisances to the local community from the excavation and construction works (headache, distractions ...etc).	Short term	Medium
Worker health and safety	- Physical hazards from falling and injuries. - Risks from movement of heavy machinery. - Physical hazards from contact with the accumulated solid waste	Short term	High

Table 8. Potential Impacts Significance during Operation Phase

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS DURING OPERATION PHASE			
Residual Impact	Description	Timescale	Magnitude
Physical Environment			
Soil	- Soil contamination with leachate in case of leakage from the leachate tank. - Collapses or overloading on the neighboring wastewater basins close to the transfer station. - Contaminated storm water and mixing of the trucks washing water, which may infiltrate and cause soil pollution.	- Long term	- Low
Surface water and Groundwater	- Leachate spillages from the existing waste will negatively impacts the water quality and will have indirect impacts of pollutants transport as the TS is located in a groundwater depression zone. - Infiltration of the leachate, sewage or the trucks washing water used for trucks to aquifer. - Polluted storm water that accumulates in the winter season in the area that could infiltrate to the groundwater.	- Long term	- Low
Noise emissions	- Noise emissions due to operation work, incoming and outgoing vehicles.	- Long term	- Medium
Ambient air quality	- Dust emissions from trucks movement and transferring the solid waste. - Action of the wind on stored construction materials; - Vehicle movement around the site on the crowded roads	- Long term	- Medium
Odor	- Dust emissions from trucks movement - Action of the wind on stored construction materials; - Movement of the incoming and outgoing vehicle movement	- Long term	- Medium

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS DURING OPERATION PHASE			
Residual Impact	Description	Timescale	Magnitude
Socio-Economic Issues			
Direct employment and income	- The operation phase will have minimum impacts on the jobs creation (2-permanent guides, 1-operations engineer)	- Long term	- Low
Solid Waste Management	- The new TS will facilitate the waste management process with less operational costs and less environmental impacts.	- Long term	- High
Transportation and Traffic	- Increase the probability of accidents especially at the roads junctions. - Conflicts with the incoming and outgoing trucks in the access road to the transfer station at the same time. - Leachate spillage during the disposal and transporting of the leachate - Waste falling from the Vehicle during transfer in case of uncovering the trucks.	- Long term	- Medium
Municipal expenditure /revenues	- The transfer station will positively affect the municipal expenditure and revenues by improving the solid waste management and disposal services by using lower number of vehicles. - It will also contribute to reduce the number of random dumpsites in Rafah area -	- Long term	- Medium
Reduced impacts of waste haulage	- The use of the transfer station will reduce the trip time of transporting the waste to the landfill	- Short term	- Medium

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS DURING OPERATION PHASE			
Residual Impact	Description	Timescale	Magnitude
Human Health			
Local community health-	- Indirect impact from movement of heavy machinery on public safety (increasing dust and noise) - The presence of pathogens, vectors and insects may increase the health risk - Indirect impacts on groundwater quality from accidental discharge/disturbance.	- Long term	- Low
Operators health and safety	- Physical hazards from falling and injuries. - Risks from movement of heavy machinery. - Physical hazards from contact with solid wastes. - The presence of pathogens, vectors and insects may increase the health risk. - Risk in case of collapse of neighboring waste water ponds.	- Long term	- Medium
Risk of Fires	- Risks of fires from the fuel tank or the existing stored wastes	- Long term	- Low

6. Environmental and Social Management Plan

6.1 Management Plan

The Environmental and Social Management and Monitoring Plan (ESMP) table presents summary of the ESMP findings regarding the construction and operation phases of the Project (table 8). It shows the predicted impacts, mitigation measures that will prevent or reduced the impacts, and monitoring arrangements. In addition, table 9 presents estimation of the annual costs of implementing mitigation measures.

6.2 Mitigation Measures

Mitigation measures are proposed to prevent or reduce the potential impacts of construction and operation of the waste transfer station in Rafah. The waste transfer station will be fully bounded by a concrete wall and covered by a steel shed. Second tree barrier will be planted against the wind direction on order to decrease any noise, odours and dust emissions from the transfer station during the construction phase.

Other mitigation measures will be implemented such paving the ground of the transfer station with a concrete pavement, and separate collection system and leachate tank will be constructed in order to prevent the soil and groundwater contamination by leachate.

The work of incoming and outgoing vehicles will be managed to be during day time, and all vehicles will be covered to avoid the inconvenience of the local community. Grievance Mechanism will be updated and activated for the local community to receive any complaints related to Rafah TS and treat them. The local community will be shared by the information about the construction of the TS, in addition to the site visits of the social community committee to monitor the progress of work.

The workers will be inspected to comply with wearing the protective equipment during the construction and operation phases.

Tables 10 and 11 present estimated costs of mitigation measures during the construction and operation phases of the Project.

6.3 Grievance Redress Mechanism:

Grievances mechanism will be activated for the local community to receive any complaints related to Rafah TS either during the construction phase or the operation phase, For the whole project, GRM will be activated for the local community to receive any complaints related to Rafah TS and the project at large. The system includes different channels, most importantly:

1- The complaint box: A complaint box will be installed in all the JSC facilities; these boxes will be supplied with an instruction board and hard copies of grievances application to be filled when there is a grievance to be submitted.
2- Using the Facebook page: by inviting the people to send their complaints using the JSC Facebook page since the website is still under construction, and the Facebook page will be announced in all the public meetings and on a board located besides the complaint box at the landfill camp.
3- Phone calls and emails: the instruction board above the complaint box will contain phone numbers of the JSC-KRM (Telephone: +97082076001, Fax:

+970820776008) and the mobile number of the social specialist (+970597652008) and email address of JCKRM (jsckrm2014@gmail.com) and the email address of the social specialist (eqandeel.jsckrm@gmail.com). Those will also be disseminated to the public through the Project Facebook page and in community meetings.

4- Online application: a website for the JSC is under construction and it will contain a link to an online grievance application to be filled by the different communities all the time.

Acknowledgment for receiving the complaint will be offered to complainant in 2 business days from receiving and then 5 business days will be taken to resolve and close the complaints under the direct control of the projects and the contractors. Longer period might be needed to address complaints that are not under the direct autonomy of the project and in such cases, the complaint will be diverted to the concerned parties and feedback will be offered to the complainant accordingly.

As soon as the grievance received the following steps will be followed to apply the process:

1- Sort and process: the grievance will take a serial number. The compliant urgency will be checked using the priority sheet.
2- Acknowledge and follow up: the complainant will receive a confirmation SMS that his/her complaint was received and is being handled using the GRM process.
3- Verify, investigate and act: the PDSU-MDLF, and TOU-JSC teams will verify and investigate about the grievance in the field and send a reply back to the complainant to inform about the response and the solution, this will be according a certain time plan for every action as mentioned above.
4- Monitor and evaluate: the JSC-KRM social specialist will check the satisfaction of the complainant through monitoring plan and then record all the process in the monthly report.
5- In case, the complainant can declare about his/her dis-satisfaction with the response of the tier one channels mentioned above, and submit another complaint for a higher level in the JSC-KRM. The social specialist will report about the problem, its solution, the person/the department who contributed in solving the problem and then the comments of the complainant on the provided solution. The executive manager of the JSC-KRM will receive the report and investigate it, then take an action, and report it to r the chairman of JSC-KRM, to be involved in the action.

   ***Note**: the chairman of the JSC-KRM is a Mayor who had authorization to take any action in the southern and middle governorates with cooperation with any other entity (municipality, governmental associations, NGOs,..), so involving the chairman will ensure the fairness of the solution.*

6.4 Client Capacity

The Monitoring of the mitigation measures during the construction phase will be mainly the responsibility of PDSU-MDLF, and TOU-JSC teams in cooperation with other partners such as the municipality and EQA. The Environmental and Social staff will follow up and submit a regular progress compliance report.

During the operation phase, MDLF and JSC-KRM will be responsible on implementing the mitigation measures. EQA and MDLF will be responsible on the monitoring in cooperation with other partners such as the municipality.

PDSU-MDLF and TOU-JSC have the capabilities to monitor the implementation of the mitigation measures during construction phase, and implement the mitigation measures during operation phase, but they may require an advance capacity building on environmental and social monitoring and reporting approaches. The capacity building could also preparation of safety and emergency response plans, and how to operate the transfer station in the emergency cases such as the wars.

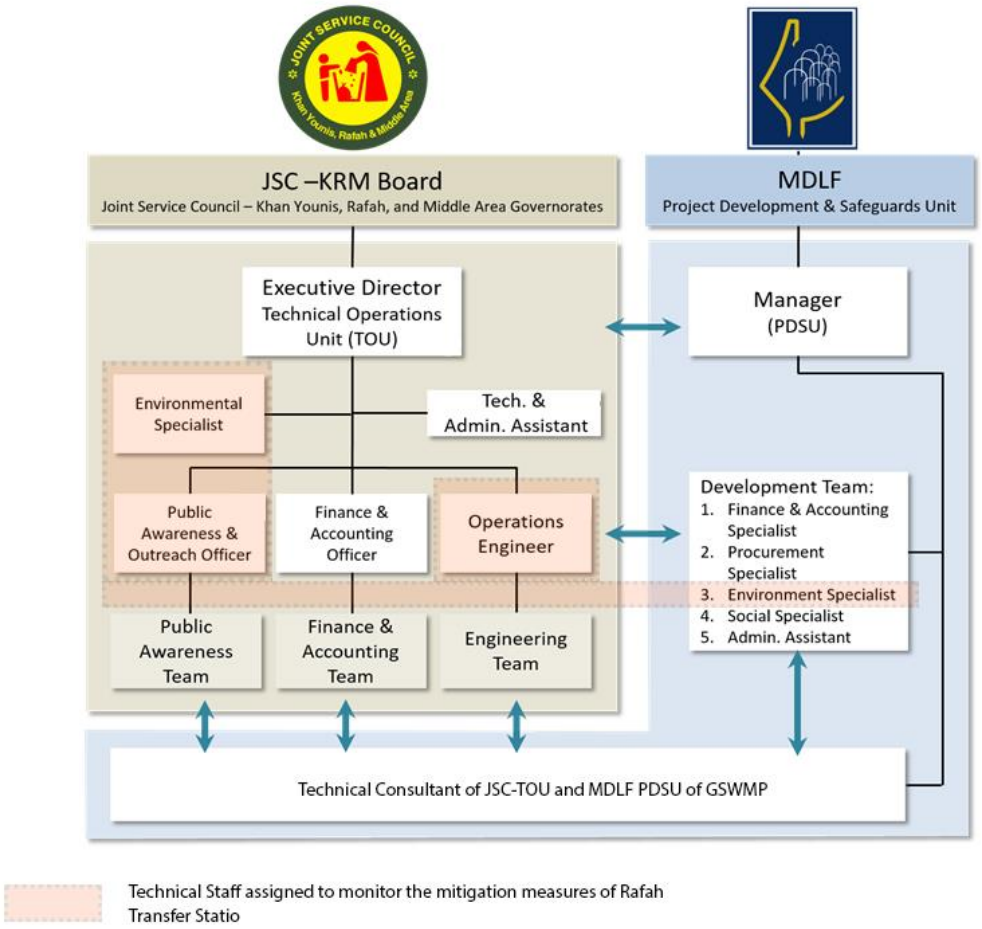


Figure 58. Gaza Solid Waste Management Project Staff Setup

Table 9. Summary of the Environmental and Social Management Plan during construction phase of Rafah Transfer Station

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
Physical Aspects	Soil and groundwater deterioration because of the existing accumulated waste at the transfer station site	1. Maintain a clean construction site by removal of the existing solid waste in the site at approved disposal site	Contractor
		2. Ensure fencing the project site prior to construction activities	Contractor
		3. Provide well maintained construction vehicles and machinery in order to minimize pollutant spillage	Contractor
	Soil erosion especially in the eastern side of the station caused by the differences in elevation and land take by spoil storage	4. Storage of soil spoils in flat area, away from drainage pattern	Contractor
		5. Ensure that the staging areas used are fenced and marked prior construction activities	Contractor
	Future contamination of groundwater and soil by leachate (during operation)	6. Constructing concrete base of the ramp and loading/ unloading area	Contractor
		7. Installation of Separate leachate collection system	Contractor
	Noise impacts caused by construction machines	8. Regular maintenance of construction machines and trucks.	Contractor
		9. Fixed equipment and loading and unloading areas should be located far from sensitive receptor	Contractor
		10. Limiting construction works to daytime working hours	Contractor
		11. Installing a brier to mitigate the noise impact	Contractor
	Deterioration of air quality by dust caused by construction works and vehicles	12. Spraying of water before excavations during strong winds and dry periods.	Contractor
		13. Spray with water stockpiles of materials during windy and dry conditions	Contractor

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
		14. Issue site workers with dust masks and appropriate dust masks and safety requirements	Contractor
	Environmental and Social impacts of construction camp	15. Domestic waste should be stored in containers and disposed when fill up.	Contractor
		16. Sewage tanks should be periodically checked, emptied, and sewage should be taken to the adjacent WWTP.	Contractor
		17. A code of conduct of the workers should be prepared and implemented for all workers in the construction camp.	Contractor
		18. Restriction on the workers communication with the surrounding community	Contactor
		19. Restriction the access of unauthorized people by installation of temporary metallic fence during construction phase and hiring a guard	Contactor
		20. Indicative signs around the construction site	Contractor
Human Health Aspects	Risk of Fires (during operation)	21. Install sufficient number of fire extinguishers around the fuel tank and near waste loading area	Rafah municipality, JSC KRM
	Odors by transferring the accumulated wastes at the existing transfer point	22. Ensure Cleaning of construction site	Contractor
		23. Covering the wastes during transport for cleaning the site	Contractor
	Health of Contractor's workers	24. Provide and ensure use of safety PPE by workers	Contractor
		25. Provide First Aid kits	Contractor

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
		26. Insurance coverage for all employees and equipment in the site including the workers of the sub-contractors	Contractor
	Local Community health	27. Identify and isolate construction zones with fence	Contractor
		28. Periodic checkup for any leakage of oil from construction vehicles	Contractor
		29. Periodic checkup of the septic tank of the construction camp	Contractor
Social and Economic Aspects	Disruption of traffic movement on the main roads by the construction vehicles and increase the probability of accidents	30. Provide temporary signs to be used during the construction phase	Contractor
	Lack of acceptance to the project from the side of the local communities	31. Continue the consultations with the communities and the coordination with the municipalities to ensure the level of acceptance for the project is increasing.	JSC KRM and MDLF
	Inconvenience of local community	32. Grievance uptake Channels (online application, complaint boxes, communication information) will be used in the site for any coming complaints during construction by ensuring significant number of indicative signs around the project site (including contact information, project description, etc.)	Contractor, JSC-KRM
		33. Information sharing with the community, and forming a committee from the local residents for monitoring the construction of TS	JSC-KRM, Municipality of Rafah
		34. Sort and process the received complaints	JSC-KRM
		35. Acknowledge and follow up the complaints	JSC-KRM

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
		36. Verify, investigate, and act to determine the validity of received grievance	JSC-KRM
		37. Monitor, evaluate and provide feedback	JSC-KRM
		38. Ensure documentation for any received compliant	Contractor, JSC KRM

Table 10. Summary of the Environmental and Social Monitoring Plan during construction phase of Rafah Transfer Station

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
Physical Aspects	1. Maintain a clean construction site by removal of the existing solid waste in the site at approved disposal site	Ensure to include cleaning the site within the bidding documents	Within the period of the construction mobilization	Rafah Municipality, supervision engineer, JSC KRM, MDLF[2]
	2. Ensure fencing the project site prior to construction activities	Visual observations, compliance with layout design	In the beginning of construction	Supervision engineer, JSC KRM, MDLF
	3. Provide well maintained construction vehicles and machinery in order to minimize pollutant spillage	Visual observation	Once a week	Supervision engineer, JSC KRM, MDLF
	4. Storage of soil spoils in flat area, away from drainage pattern	Visual observations, compliance with layout	Once a week,	Supervision engineer, JSC KRM, MDLF

[2] MDLF and JSC-KRM staff members who will monitor the compliance of mitigation measures are Environmental and Social Specialists

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
		design, photographic evidence, inspection reports	Monthly for Same point vantage photographs	
	5. Ensure that the staging areas used are fenced and marked prior construction activities	Visual observations, compliance with layout design	In the beginning of construction	Supervision engineer, JSC KRM, MDLF
	6. Constructing concrete base of the ramp and loading/ unloading area	Visual observations of compliance with transfer station design, photographic evidence	Twice a week during construction	Supervision engineer, MDLF, JSC KRM
	7. Installation of Separate leachate collection system	Visual observations of compliance with design of leachate collection system	Once a week during construction of leachage collection system	Supervision engineer, MDLF, JSC KRM
	8. Regular maintenance of construction machines and trucks.	Logbook, random physical checks	Daily (Contractor) Weekly (MDLF, JSC KRM)	Contractor
	9. Fixed equipment and loading and unloading areas should be located far from sensitive receptor	Visual observations	Daily	Contractor, MDLF, JSC KRM
	10. Limiting construction works to daytime working hours	Logbook, Records of complaints, site inspections	Once a week	Supervision Engineer, MDLF
	11. Installing a brier to mitigate the noise impact	Logbook, Records of complaints, site inspection	In case of receiving complaints	
	12. Spraying of water before excavations during strong winds and dry periods.	Visual observations, logbook	Twice a week during dry weather or strong winds	Supervision Engineer, MDLF, JSC KRM

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
	13. Spray with water stockpiles of materials during windy and dry conditions	Visual observations, site inspection	Daily during wet weather or strong winds	Supervision Engineer, MDLF, JSC KRM
	14. Issue site workers with dust masks and appropriate dust masks and safety requirements	Visual observations, site inspection	Randomly (at least twice a week)	Supervision Engineer, MDLF, JSC KRM
	15. Domestic waste should be stored in containers and disposed when fill up.	Visual inspections, logbook	Once a week	Contractor, Supervision Engineer, MDLF, JSCKRM
	16. Sewage tanks should be periodically checked, emptied, and sewage should be taken to the adjacent WWTP.	Visual observations, logbook	Once a week	Supervision Engineer, MDLF, JSCKRM
	17. A code of conduct of the workers should be prepared and announced for all workers in the construction camp.	Visual observations, log Book	Weekly	Supervision Engineer, MDLF, JSCKRM
	18. Restriction on the workers communication with the surrounding community	Visual inspection	weekly	Supervision Engineer, MDLF, JSCKRM
	19. Restriction the access of unauthorized people by installation of temporary metallic fence during construction phase and hiring a guard	Visual observation	Twice a week	Supervision Engineer, MDLF, JSCKRM
	20. Indicative signs around the construction site	Visual observations	monthly	Supervision Engineer, MDLF, JSCKRM

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
Human Health Aspects	21. Install sufficient number of fire extinguishers around the fuel tank and near waste loading area	Visual inspections	Prior the operation	MDLF, JSC KRM, Rafah municipality
	22. Ensure Cleaning of construction site	Ensure to include cleaning the site within the bidding documents	Within the period of the construction phase	Rafah Municipality, JSC KRM, MDLF
	23. Covering the wastes during transport for cleaning the site	Visual observation, photographic evidence	In prior of construction	Rafah Municipality, JSC KRM, MDLF
	24. Provide and ensure use of safety PPE by workers	Visual observations	Randomly (at least twice a week)	Contractor, Supervision Engineer, MDLF, JSCKRM
	25. Provide First Aid kits	Visual observations	Once a week	Supervision Engineer, MDLF, JSCKRM
	26. Insurance coverage for all employees and equipment in the site including the workers of the sub contractors.	Official document, inspection	Once a month	Supervision Engineer, MDLF, JSCKRM
	27. Identify and isolate construction zones with fence	Visual observations	Daily (contractor, supervision engineer) Randomly at least once a week (MDLF, JSC KRM)	Contractor, supervision engineer, MDLF, JSC KRM
	28. Periodic checkup for any leakage of oil from construction vehicles	Visual observations, logbook, photographic evidence	Daily (contractor, supervision engineer) Twice a week (MDLF, JSC KRM)	Contractor, Supervision Engineer, MDLF, JSC KRM
	29. Periodic checkup of the septic tank of the construction camp	Visual observations, logbook	Once a week	Contractor, Supervision Engineer

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
Social and Economic Aspects	30. Provide temporary signs to be used during the construction phase	Visual Inspection	Prior to the construction activities	MDLF, JSC KRM
	31. Continue the consultations with the communities and the coordination with the municipalities to ensure the level of acceptance for the project is increasing.	Results of the consultations Records of coordination between JSC and the municipalities	At different stages of the project.	MDLF, JSC KRM
	32. Grievance uptake Channels (online application, complaint boxes, communication information) will be used in the site for any coming complaints during construction by ensuring significant number of indicative signs around the project site (including contact information, project description, etc.)	Logbook, Monthly reports	Weekly	MDLF, JSC
	33. Information sharing with the community, and forming a committee from the local residents for monitoring the construction of TS	Facebook posts, Forming committee, workshop	Four times per year	MDLF
	34. Sort and process the received complaints	Logbook	Weekly	MDLF
	35. Acknowledge and follow up the complaints	Logbook	Weekly	MDLF
	36. Verify, investigate, and act to determine the validity of received grievance	Logbook	Twice a month	MDLF

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
	37. Monitor, evaluate and provide feedback	Logbook	Monthly	MDLF
	38. Ensure documentation for any received compliant	Excel sheets, Photographic evidence, logbook	Four times per year	MDLF

Table 11. Summary of the Environmental and Social Management Plan during operation phase of Rafah Transfer Station

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
Physical Aspects	Contamination of groundwater and soil by leachate, and toilet drainage during operation phase	1. Regular maintenance of the leachate tank and the collection pipes	Rafah municipality, JSC KRM
		2. Sampling and testing of groundwater	Rafah municipality, JSC KRM
		3. Evacuate and transfer the Leachate to the nearest WWTP	Rafah municipality
		4. Proper drainage of wastewater, storm water. Store the vehicles under parking area of the rainy weather	Rafah municipality, JSC KRM
		5. Sample test of leachate before dumping the leachate to the nearest WWTP.	Rafah municipality, JSC KRM
	Deterioration of air quality by dust caused by the operation of vehicles	6. Water spray of the operation site	Rafah municipality, JSC KRM
		7. Implement preventive maintenance program for vehicles and promptly repair vehicle with visibly high exhaust	Rafah municipality, JSC KRM
		8. Strict application of personnel protective equipment and wear by municipality and JSC KRM workers	Rafah municipality, JSC KRM
		9. Planting Trees and plants along buffer zone	Rafah municipality, JSC KRM
		10. Limiting operation works to daytime	Rafah municipality, JSC KRM

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
	Noise impacts caused by Waste Vehicles and Electrical Generator	11. Regular maintenance of vehicles and generator	Rafah municipality, JSC KRM
		12. Schedule the movement of vehicles carefully	Rafah municipality, JSC KRM, UNRWA
		13. Planting Trees and plants surrounding the transfer station	MDLF, JSC KRM
	Waste Management inside the transfer station	14. No hazardous waste is accepted to be received in the transfer station. The transfer station is designed to receive Municipal Solid Waste only.	JSC-KRM, Rafah Municipality
		15. Schedule the movement of incoming vehicles and carts, and outgoing roll on/off vehicles	JSC-KRM, Rafah Municipality
Human Health Aspects	Waste Management inside the transfer station	16. Preventing any storage of waste more than 24 hours	JSC-KRM
	Risk of Fires	17. Install sufficient number of fire extinguishers around the fuel tank and near waste loading area	Rafah municipality, JSC KRM
		18. Prepare an Emergency Response Plan to deal with possible fires	Rafah municipality, JSC KRM
		19. Train the workers/drivers about how to deal with fires as indicated in the Emergency Response Plan	MDLF, JSC KRM, Rafah municipality
	Odors caused by the stored and transported waste	20. Wash of the tipping area and the solid waste vehicles	Rafah municipality, JSC KRM
		21. Covering of the transported waste to the landfill	JSC KRM
		22. Regular transport of the incoming waste	JSC KRM

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
		23. The remaining waste at the night (if any) should be put in roll on/off container and covered	JSC-KRM, Rafah municipality
	Local Community Health	24. Isolate operation Zones / Trees Buffer Zone	Rafah municipality, JSC KRM
		25. Restriction the access of unauthorized people by hiring a guard	Rafah Municipality
		26. Transfer the solid waste daily to the landfill	JSC KRM
		27. Leachate to be collected in the vehicle tank during waste collection and transportation, periodic maintenance to be made for leachate tanks.	JSC KRM
	Workers Health and Safety	28. Provision and use of the PPE by workers	Rafah municipality, JSC KRM
		29. Provide First Aid kits	Rafah municipality, JSC KRM
		30. Install sufficient number of fire extinguisher around the fuel tank and near waste loading area	Rafah municipality, JSC KRM
		31. Implement an operation plan, safety plan and emergency response plan for workers	JSC-KRM
Social and Economic Aspects	Disruption of traffic movement on the main roads by the coming and outgoing solid waste vehicles and increase the probability of accidents	32. Restrict transport trucks travel to the hours outside the rush hours	Rafah municipality, JSC KRM
		33. Strict monitoring to the road accidents and install signs	Rafah municipality, JSC KRM
		34. Schedule the movement of vehicles and carts carefully	JSC KRM
	Lack of acceptance to the project from the side of the local communities	35. Continue the consultations with the communities and the coordination with the municipalities to ensure the level of acceptance for the project is increasing.	JSC KRM and MDLF

ENVIRONMENTAL AND SOCIAL ASPECTS	IMPACTS	MITIGATION MEASURES	IMPLEMENTATION RESPONSIBILITY
	Inconvenience of local community	36. Grievance uptake Channels to be activated for any coming complaints during operation (online application, and complaint box, communication numbers), then compiling the complaints following the approved process.	JSC-KRM
		37. Information sharing with the community through the established social committee	JSC-KRM, Municipality of Rafah
		38. Sort and process the received complaints	JSC-KRM
		39. Acknowledge and follow up the complaints	JSC-KRM
		40. Verify, investigate, and act to determine the validity of received grievance	JSC-KRM
		41. Monitor, evaluate and provide feedback	JSC-KRM
		42. Ensure documentation for any received compliant	JSC KRM

Table 12. Summary of the Environmental and Social Monitoring Plan during operation phase of Rafah Transfer Station

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
Physical Aspects	1. Regular maintenance of the leachate tank and the collection pipes	Visual observations	Semi-annual	MDLF, EQA
	2. Sampling and testing of groundwater	Testing of: (TDS, TSS, Cl, NO3, pH, COD, BOD, Ammonia)	Annually	EQA
	3. Evacuate and transfer the Leachate to the nearest WWTP	Visual observations	Twice a week	MDLF, JSC KRM

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
	4. Proper drainage of wastewater, storm water. Store the vehicles under parking area of the rainy weather	Visual observations	During the rainy weather	MDLF, JSC KRM
	5. Sample test of leachate before dumping the leachate to the nearest WWTP.	Testing of: pH, COD, BOD, chloride, nitrate, ammonia, TOC, acidity, hardness, sulfate, lead, iron, cadmium, zinc, copper	Four times per year (first year of operation), Semiannually after	MDLF, CMWU, EQA
	6. Water spray of the operation site	Visual observations, logbook	Once a week	MDLF, JSC KRM
	7. Implement preventive maintenance program for vehicles and promptly repair vehicle with visibly high exhaust	Visual observations, inspection	Daily	MDLF, JSC KRM
	8. Strict application of personnel protective equipment and wear by municipality and JSC KRM workers	Visual observation, logbook	Randomly (at least twice a week)	MDLF, JSC KRM
	9. Planting Trees and plants along buffer zone	Photographic evidence, visual observation	Prior to the operation phase	MDLF, JSC KRM
	10. Limiting operation works to daytime	Visual inspections	Randomly (at least twice a week)	MDLF, JSC KRM
	11. Regular maintenance of vehicles and generator	Visual observations	Daily	MDLF, JSC KRM
	12. Schedule the movement of vehicles carefully	Visual inspections	Weekly	JSC KRM, Rafah municipality
	13. Planting Trees and plants surrounding the transfer station	Visual observations	Prior the operation phase	MDLF, EQA
	14. No hazardous waste is accepted to be received in the transfer station. The	Visual inspections	Monthly	EQA

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
	transfer station is designed to receive Municipal Solid Waste only.			
	15. Schedule the movement of incoming vehicles and carts, and outgoing roll on/off vehicles	Visual inspections	Weekly	JSC-KRM
Human Health Aspects	16. Preventing any storage of waste more than 24 hours	Visual inspections	Daily	MDLF, EQA
	17. Install sufficient number of fire extinguishers around the fuel tank and near waste loading area	Visual inspections	Monthly	EQA
	18. Prepare an Emergency Response Plan to deal with possible fires	Visual inspections	Weekly	JSC-KRM
	19. Train the workers/drivers about how to deal with fires as indicated in the Emergency Response Plan	Visual inspections	Daily	MDLF, EQA
	20. Wash of the tipping area and the solid waste vehicles	Visual observation	Daily	MDLF, JSC KRM
	21. Covering of the transported waste to the landfill	Visual observation, photograph evidence	at least twice a week	JSC KRM, MDLF
	22. Regular transport of the incoming waste	Visual observation	Daily	MDLF, Rafah municipality
	23. The remaining waste at the night (if any) should be put in roll on/off container and covered	Visual inspections	Twice per month	MDLF, JSC KRM
	24. Isolate operation Zones / Trees Buffer Zone	Visual observations	Prior operation -phase	MDLF, JSC KRM
	25. Restriction the access of unauthorized people by hiring a guard.	Visual observations	Weekly	MDLF, JSC KRM

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
	26. Transfer the solid waste daily to the landfill	Visual inspections, logbook	Daily	MDLF, JSCKRM, Rafah municipality
	27. Leachate to be collected in the vehicle tank during waste collection and transportation, periodic maintenance to be made for leachate tanks.	Visual inspections	Monthly	EQA
	28. Provision and use of the PPE by workers	Visual inspections	Daily	MDLF, JSC KRM, Rafah municipality
	29. Provide First Aid kits	Visual inspections	Daily	MDLF, JSC KRM, Rafah municipality
	30. Install sufficient number of fire extinguisher around the fuel tank and near waste loading area	Visual inspections	Weekly	MDLF, JSC KRM, Rafah municipality
	31. Implement an operation plan, safety plan and emergency response plan for workers	Visual observation	Updated regularly	MDLF
Social and Economic Aspects	32. Restrict transport trucks travel to the hours outside the rush hours	Visual Inspection	Within the operation phase	Supervision engineer, Rafah municipality, MDLF, JSC KRM
	33. Strict monitoring to the road accidents and install signs	Visual Inspection, accident reports	Within the operation phase	MDLF, JSC KRM
	34. Schedule the movement of vehicles and carts carefully	Visual inspections	Weekly	MDLF, JSC KRM
	35. Continue the consultations with the communities and the coordination with the municipalities to ensure the level of acceptance for the project is increasing.	Results of the consultations Records of coordination between JSC and the municipalities	At different stages of the project.	MDLF, JSC KRM

ENVIRONMENTAL AND SOCIAL ASPECTS	PROPOSED MITIGATION MEASURES	COMPLIANCE MONITORING APPROACH	MONITORING FREQUENCY	RESPONSIBILITY FOR COMPLIANCE MONITORING
	36. Grievance uptake Channels to be activated for any coming complaints during operation (online application, and complaint box, communication numbers), then compiling the complaints following the approved process.	Logbook, Monthly Reports	Weekly	MDLF, JSC
	37. Information sharing with the community through the established social committee	Facebook posts, workshop, site visits	Four times per year	MDLF
	38. Sort and process the received complaints	Logbook	Weekly	MDLF
	39. Acknowledge and follow up the complaints	Logbook	Weekly	MDLF
	40. Verify, investigate, and act to determine the validity of received grievance	Logbook	Twice a month	MDLF
	41. Monitor, evaluate and provide feedback	Logbook	Monthly	MDLF
	42. Ensure documentation for any received compliant	Excel sheets, Photographic evidence, logbook	Four times per year	MDLF

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ANNEX 1: Questionnaire for local communities

استبانة للسكان المحيطين بمحطة ترحيل النفايات الصلبة في منطقة تل السلطان برفح

Questionnaire for local communities surrounding Rafah Solid Waste Transfer Station

اليوم:	التاريخ:	رقم الاستبيان:
اسم الباحث:	اسم المجيب على الاستبيان:	

- المحور الأول / المعلومات العامة

1. العمر:	① أقل من 30	② 30 -39	③40 -49	④50 -59	⑤ أكثر من 60
2. الجنس	① ذكر	② انثى			
3. مكان السكن بالتحديد(البعد عن المحطة)	① اقل من 500 متر	② اكثر من 500 متر	③على جانب الطريق		
4. مجال العمل:	① موظف	② مزارع	③ تاجر	④ صياد	⑤ بلا عمل
5. المستوى المعيشي للأسرة	① جيد	② متوسط	③ ضعيف		
6. عدد أفراد الأسرة :	① اقل من 3	② 5-4	③ 7-6	④ 9-8	⑤ 10 فأكثر

- المحور الثاني / الجمع والترحيل الاولي للنفايات

7. ما هي طرق جمع النفايات في منطقتكم ؟	① منزل الى منزل	② حاويات	
8. اذا كانت الاجابة "حاويات" هل تتوفر حاويات قريبة وكافية في منطقتكم؟	① نعم	② لا	③ لا أعلم
9. هل هناك مشاكل اجتماعية بينك وبين الجيران بخصوص وضع النفايات والحاويات؟	① نعم	② لا	
10. هل يتم جمع النفايات والتخلص منها بشكل منتظم ؟	① نعم	② لا	③ لا أعلم
11. ما تقييمكم لأداء البلدية في عملية جمع النفايات ؟	① جيدة	② سيئة	③ لا أعلم
12. هل تعلم اين تذهب النفايات بعد ان يتم ترحيلها من البلدية؟	① نعم	② لا	③ لا أعلم
13. هل توجد مناطق تجميع عشوائية للنفايات في منطقتكم؟	① نعم	② لا	③ لا أعلم

- المحور الثالث / محطة الترحيل النفايات الصلبة

14. هل سمعت بإقامة محطة ترحيل النفايات الى المكب ؟	① نعم	② لا	
15. هل تؤيد إقامة محطة ترحيل النفايات في منطقتكم ؟	① نعم	② لا	③ لا أعلم
16. هل توافق ان هناك اثار ايجابية لإقامة محطة ترحيل النفايات؟	① نعم	② لا	③ لا أعلم
17. اذا كانت الاجابة نعم, هل تعتقد ان الاثار الايجابية لمحطة ترحيل النفايات هي:	1- خلق فرص عمل وتقليل معدل البطالة. 2- تقليل كمية النفايات الموجودة في المنطقة. 3- تقليل تكاليف نقل النفايات الصلبة. 4- لا اعلم.		
18. ماهي الآثار السلبية برأيكم لتراكم النفايات في المناطق السكنية في الوضع الحالي؟	1- _____ 2- _____ 3- _____		
19. ما هي اقتراحاتكم لتقليل الأثار السلبية في الوضع الحالي؟	1- _____ 2- _____ 3- _____		

- المحور الرابع / نوعية الهواء

20. هل تعاني من أي روائح ظاهرة أو رذاذ في الهواء ؟	① نعم			② لا
21. اذا الإجابة (نعم) , في أي وقت تعانون من هذه الروائح ؟	① وقت الصباح	② وقت الظهيرة		③ وقت المساء
22. هل تعاني من غبار ؟	① نعم			② لا
23. اذا الإجابة (نعم) فما هو مصدر الغبار؟	① سيارات	② كسارات	③ مكب النفايات	④ أخرى
24. ما هي الإجراءات التي تتخذها للتخلص من الغبار ؟	1- _____ 2- _____ 3- _____			
25. هل تعاني من انبعاثات الحرائق في الهواء الجوي ؟	① نعم			② لا
26. اذا الإجابة (نعم) فما هو سبب هذه الحرائق ؟	① حرق النفايات ذاتيا او بشكل متعمد من السكان			② أخرى

- المحور الخامس / مركبات النقل والمرور

27. هل تعاني من وجود ازدحام مروري بسبب حركة مركبات جمع النفايات؟	① نعم		② لا
28. هل تتوقع حدوث حوادث سير ناجمة عن حركة مركبات جمع النفايات ؟	① نعم		② لا
29. هل تعاني من ازعاج وضوضاء ناتجة عن حركة مركبات جمع النفايات من والى المكب ؟	① نعم		② لا
30. هل تتوقع وجود انبعاثات الناتجة عن آليات النقل ؟	① نعم		② لا

- المحور السادس / الصحة العامة والسلامة

31. هل تعاني من انتشار الذباب ؟	① نعم		② لا
32. هل تعلم بقيام البلدية بأعمال لمكافحة الذباب ؟	① نعم		② لا
33. اذا كانت الإجابة (نعم) اذكر هذه الإجراءات ؟	1- _____ 2- _____ 3- _____		
34. هل تعاني من وجود القوارض في المنطقة ؟	① نعم		② لا
35. هل تعلم بقيام البلدية بأعمال لمكافحة القوارض؟	① نعم		② لا
36. اذا كانت الإجابة (نعم) اذكر هذه الإجراءات ؟	1- _____ 2- _____ 3- _____		
37. هل تعاني من مرض جلدي أو تنفسي أو أحد أفراد أسرتك ؟	① نعم		② لا
اذا الإجابة (نعم) اذكر ماهية المرض ؟	اذكر المرض :		
38. اذا كانت الاجابه (نعم) هل تعتقد أن هذا المرض سببه المكب ؟	① نعم		② لا
ما هي توصياتكم ؟	**1-** _____ **2-** _____ **3-** _____		

Annex 2: List of Attendance of the Community and Consultation Workshop on 27 November 2016

	Name	Institute	Tel
1	Dr. Samir Afifi	The Consultant for ESMP	0599465665
2	Dr. Ali Barhoom	JSE KRM Director	0599815100
3	Mr. Subhy Radwan	The Mayor of Rafah Municipality	0597090006
4	Mr. Zuhdi Salah	UNRWA – Environmental Health Department	0599815448
5	Mr. Nour El Madhoon	MDLF	0599480257
6	Mr. Samir Matar	MDLF	0592879121
7	Mr. Majed Abu Shaban	MDLF	0592188856
8	Ms. Reem AbuKmeil	JSE KRM	0597749092
9	Ms. Ahlam AlUmoor	JSE KRM	0599457791
10	Ms. Nuha Abu Lebda	RAI Consultant	0599093183
11	Mr. Mohammed Ali Barhoom	Rafah Municipality	0598266800
12	Mr. Atef Jaber	Environment Quality Authority	0599730157
13	Mr. Ahmed Salem Abu Shuka	Environmental health UNRWA	0597920107
14	Ms. Wafa Abu Sultan	Rafah Municipality	0597760121
15	Ms. Asma Juma El Dam	Rafah Municipality	0597313205
16	Ms. Amal Abu Hamra	Rafah Municipality	0599527691
17	Ms. Amal El Khalidi	Rafah Municipality	0592363454
18	Ms. Nima Abu Inkera	Rafah Municipality	0599515326
19	Mr. Samir Barhoom	Rafah Municipality	0599726096
20	Mr. Usama Yehia Sheikh Eid	Ministry of Agriculture – Rafah office	0599736446
21	Mr. Hisham Mutasem Hasouna	Islamic University	0599861924
22	Mr. Mohammed Sabri Musleh	Environment Quality Authority	0597000241
Local Communities			
23	Mr. Kamal Ibrahim Al Satary	Tal El Sultan neighborhood Committee	0599994425
24	Mr. Mohammed Nazmi El Luka	Tal El Sultan neighborhood Committee	0598881769
25	Mr. Mohammed Sadi El Sha'er	Tal El Sultan neighborhood Committee	0599357236
26	Mr. Ghassan Samir Abu Shear	Tal El Sultan neighborhood Committee	0599492690
27	Mr. Sami Awad	Student	0592211785
28	Mr. Iyad Ahmad Barhoom	ALSudi neighborhood Committee	0599852899
29	Mr. Nabeel Salem Abu Jazar	Rafah Farmers Association	0599916910
30	Mr. Mohammed Zeid El Nerab	Palestinian Environment Friends Association (PEF)	0599419815
31	Ms. Lila Khashan	Sociologist	0597341645
32	Mr. Khalid El Tery	Mawasi neighborhood Committee	0599949525
33	Ms. Sharifa AbedAllah Abed Rabu	Women activities Center	0599486006
34	Mr. Sami Fuju	Western Rafah neighborhood Committee	0599400124
35	Mr. Muath Samir Afifi	ALMADINA Consultants	0599480149
36	Mr. Alla Mohmmd Awad	ALMADINA Consultants	0597120063
37	Mr. Hilmi Hamza Nufal	ALSudi neighborhood Committee	0592777573
38	Mr. Suliman Al Mlalha	AlHashash neighborhood Committee	0595914432
39	Ms. Rania El Jamal	Wefaq Association for Mother and Child	0599279938
40	Ms. Majah Yehia Ayash	Women activities Center	0599770332