PLEASE Project
Plastic Free Rivers and Seas for South Asia

South Asia Co-operative Environment Programme (SACEP) Plastic free Rivers and Seas for South Asia (P171269)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) OF RECYCLING FACILITY - BAMAL

GRANTEE: ALTAS - PAKISTAN

Implemented by: SACEP
Supported by: UNOPS
Supported by: WORLD BANK GROUP

1. Subproject Information

Subproject Title:	PE (Polyethylene) Shopping Bags Recycling Plant: A Circular Economy Initiative
Estimated Cost:	1,000,000 USD
Start/Completion Date:	15th March 2024 - 31st August 2025

2. Site/Location Description

Proposed Location overview

The site selection for the project has been made after considering various factors to ensure that the facility operates efficiently and has minimal environmental and social impacts. The proposed location for developing the PE Recycling Facility is in the Bamal area of District Hyderabad. Specifically, the selected site is the GTS-Mehar Ali (Garbage Transfer Station), which is presently used as a temporary waste storage point. AtlasPak temporarily stores approximately 1,100 tons of municipal solid waste (MSW) per day from four different zones of Hyderabad at this site. As per current practice, the waste from this site is then transported daily to the Lonikot landfill using dumper trucks with a capacity of 25 m^3 each.

Geographic Context

The proposed site covers an area of 5 acres, designated for the temporary collection of municipal solid waste. Out of this, 2 acres will be allocated for the construction of the PE Recycling Facility, which is adequate to accommodate the development of the facility, supporting infrastructure, and provisions for future expansions. The site is connected to the Khusar Link Road which is approx. 6 meters wide so there is no traffic congestion and easy access for vehicular movement. Also, the site has easy access to the nearby roads and highways, for efficient transportation of raw materials and end-product supply and transportation. As part of the project, a paver road connecting the main existing road to the proposed facility will be constructed.

The coordinates of the site are 25* 34’ 36.90°N latitude and 68* 35 '81.41°E longitude, respectively. Approximately 1000 meters away from the GTS site, a 4-inch water pipeline runs through the nearby residential area. This pipeline will be connected to the GTS prior to the commencement of the construction phase. During both the construction and operational phases, the water supply will be provided through a 2-inch water pipeline.

Indus River is one of the prominent features of the study area, which flows along the western edge of the city. The Indus River is a lifeline for Hyderabad, providing water for irrigation, transportation, and industry. The Indus River is approximately 2 Km away from the proposed GTS site.

Map 01 - Location of the proposed site. *Link to map 25.343420° 68.357567°*

Map 02 - Proximity of the Project Site to the Indus River ***Link to map 25.343420° 68.357567°***

Ecological Context

The proposed site, GTS-Mehar Ali, is currently being utilized as a temporary waste dumping area. The site has no significant flora and fauna, except small bushes and weeds growing occasionally. Common domesticated animals, such as cows, buffaloes, and goats, occasionally roam around the area. The soil ecology of the proposed site is characterized by slightly clayey and silty soil with sedimentation. The groundwater table at the site is located at a depth of 5 to 6 feet. Additionally, the existing ground level demonstrates a safe allowable bearing capacity of 1.08 tons per square foot (Tsf), indicating that the site is suitable for construction purposes.

Additionally, the proposed site does not encompass or lie in proximity to any sensitive areas, such as ecologically significant zones (e.g., wildlife sanctuaries) or culturally sensitive sites.

Site Climatic Conditions:

The facility lies under tropical Savanna Climatic conditions and has a semi-arid climate. Hyderabad generally experiences a hot and arid climate, with mild winters and long, hot summers.

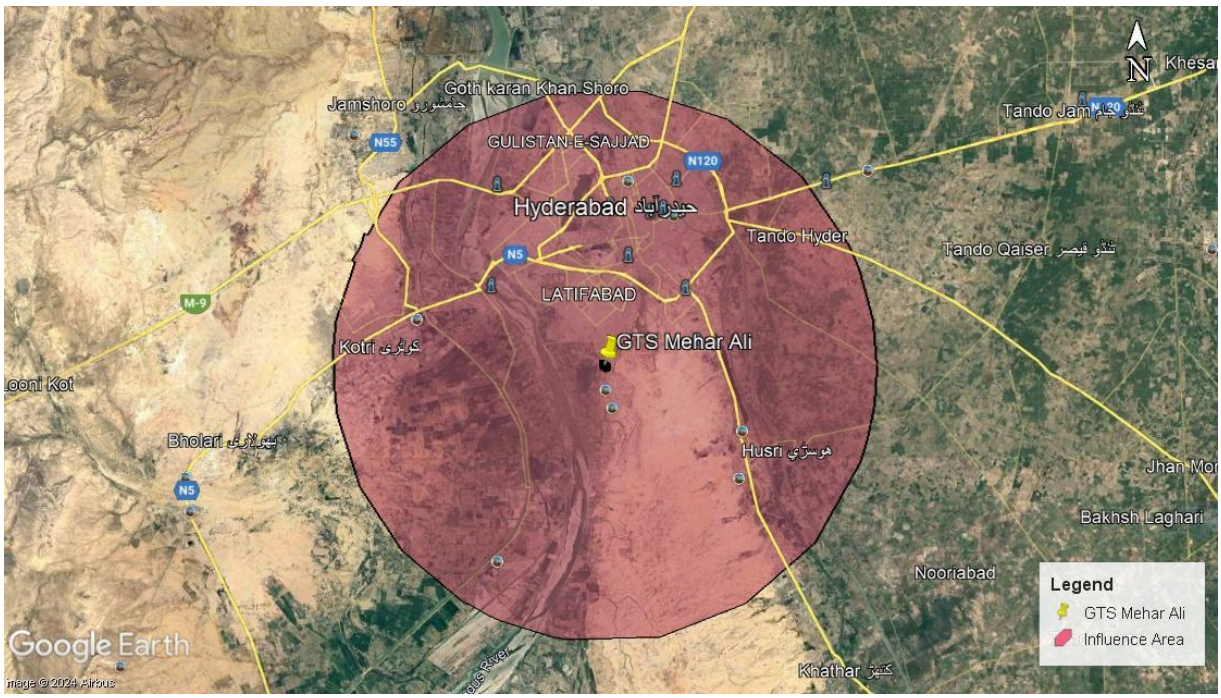
- **Maximum Temperature:** During the summer months (May to August), the temperature can reach 40°C to 45°C (104°F to 113°F).
- **Minimum Temperature:** In the winter months (December to February), the temperature can drop to around 8°C to 12°C (46°F to 54°F), with the coldest month being January.

Social Context

The proposed site is located at a distance of approximately 8-10 kilometers from the nearest residential colonies. As a result, the project is not expected to have any adverse effects on the surrounding communities. Additionally, the project aims to contribute positively to the local economy by creating employment opportunities for a diverse range of community members.

Surrounding Areas:

The GTS Mehar Ali site is surrounded by an informal settlement (slum area) at a distance of approx. 2 km away in the North of the Site and a few commercial shops at approx distance of 1 km from the proposed site in the South direction. However, these settlements are located at a sufficient distance (approx. 1-1.5 km) from the site and are not impacted by the project's operations.



Map 03 - Project Area of Influence ***Link to map 25.343420° 68.357567°***

Land Use and Ownership

- **Primary Use:** The land is allotted specifically for solid waste management operations, serving as a Garbage Transfer Station (GTS). It functions as an intermediate facility for receiving municipal solid waste from four zones of Hyderabad daily and transporting waste to landfill sites (Lonikot).
- **Ownership:** The GTS Mehar Ali land is owned by the Government of Sindh and allocated to **AtlasPak** through collaboration with the Sindh Solid Waste Management Board (SSWMB) for 9 years. The total land area is 02-00 acres from S.No.89 of DEH MALH, Tapo Khathar Latifabad will be used for the proposed project for the establishment of the PE Recycling Facility.

Timeline

The timeline for the development of the PE Recycling plant at the proposed location should consider the region's seasonal variations. The construction period for the proposed project starts from November and ends till the end of December. During this time, there is a potential for

unexpected weather conditions, which may impact construction activities and pose safety risks to workers such as cold and flu due to temperature drops during the winter season.

3. Subproject Description and Activities

The Project is prepared under the South Asia Co-operative Environmental Programme (SACEP) Plastic Free Rivers and Seas for South Asia (PLEASE) Project. This ESMP has been prepared for the implementation of this sub-project specifically and is based on the overall Project Environmental and Social Management Framework (ESMF)[1]. Project activities included,

1. Promoting public awareness on plastic bags pollution, fostering community engagement, and building capacity to protect the Indus River and marine ecosystems.
2. Establishment of a low-density polyethylene (PE) recycling plant to tackle plastic bag pollution, utilizing a circular economy model by employing the informal sector for conveyor belt sorting and providing incentives.
3. Promotion of responsible conversion and production of plastic waste by recycling into innovative end-products, such as manhole covers.

The site benefits from direct access to a 6-meter-wide Khusar Link road, thus eliminating the need for the construction of an external access road. However, to connect with the link road, a 15 meter long paver road will be constructed to ensure efficient internal transportation and operations. Further, a 100 kV transformer is already present at the proposed site and an additional 100 kV connection will be installed to meet the energy needs for the PE Recycling plant. Moreover, Communication campaigns have been initiated at the proposed site, focusing on nearby informal sectors and communities to raise awareness about plastic recycling, through conducting awareness sessions, distributing brochures, pamphlets, and banners, and placing signboards, and banners around the site area to inform the public about the installation of the PE recycling plant.

Project Construction Activities:

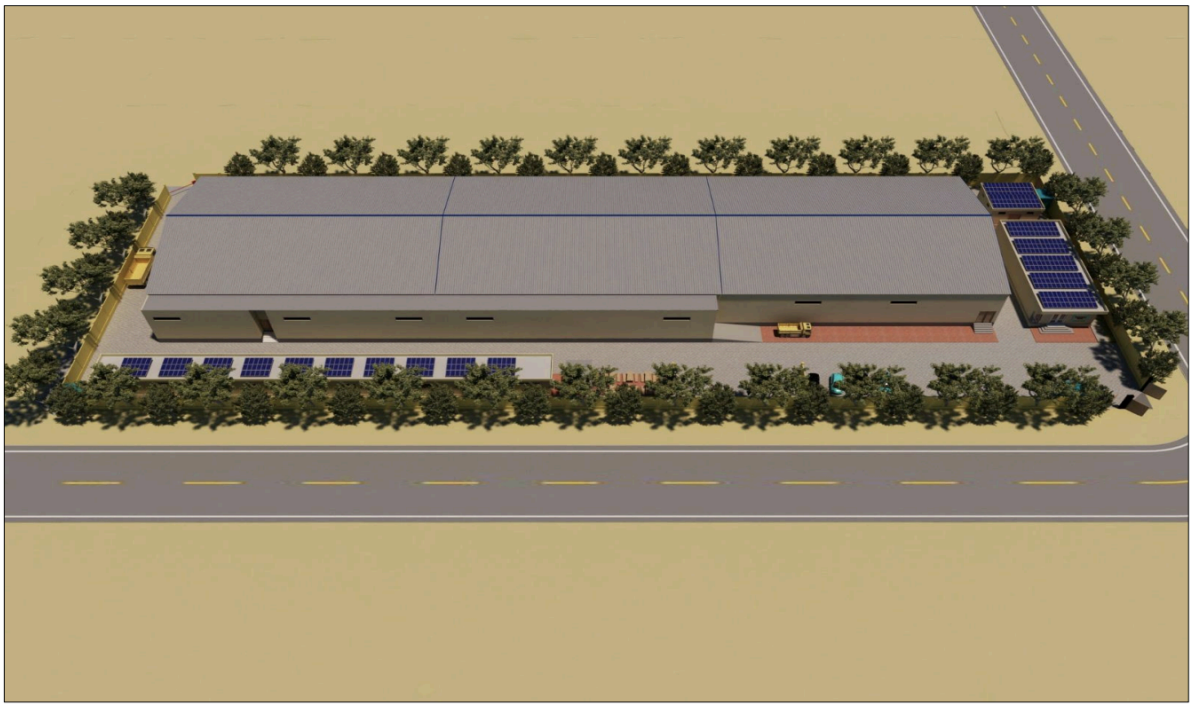
[1] South Asia Co-operative Environment Programme (SACEP) Plastic free Rivers and Seas for South Asia: Environmental and Social Management Framework (ESMF).

The main activities involved during the construction of the proposed PE Recycling plant at the proposed location have been listed below.

- Site Preparation
- Clearing of GTS land by removing the weed bushes and dumping solid waste to landfill sites.
- Site Grading and Levelling
- Excavation of land, (digging and removal of earth and rock from the site using heavy machinery like excavators and bulldozers etc.).
- Drilling, trenching, and foundation laying for construction of the facility.
- Foundation Work for PEB Shed
- Excavation
- Formwork and Reinforcement
- Concrete Pouring
- Construction of PEB Shed
- Inside Facility Paver Network Construction
- Base Layer Construction
- Asphalt Paving
- Installation of Plastic Recycling Plant
- Equipment Foundation
- Equipment Installation

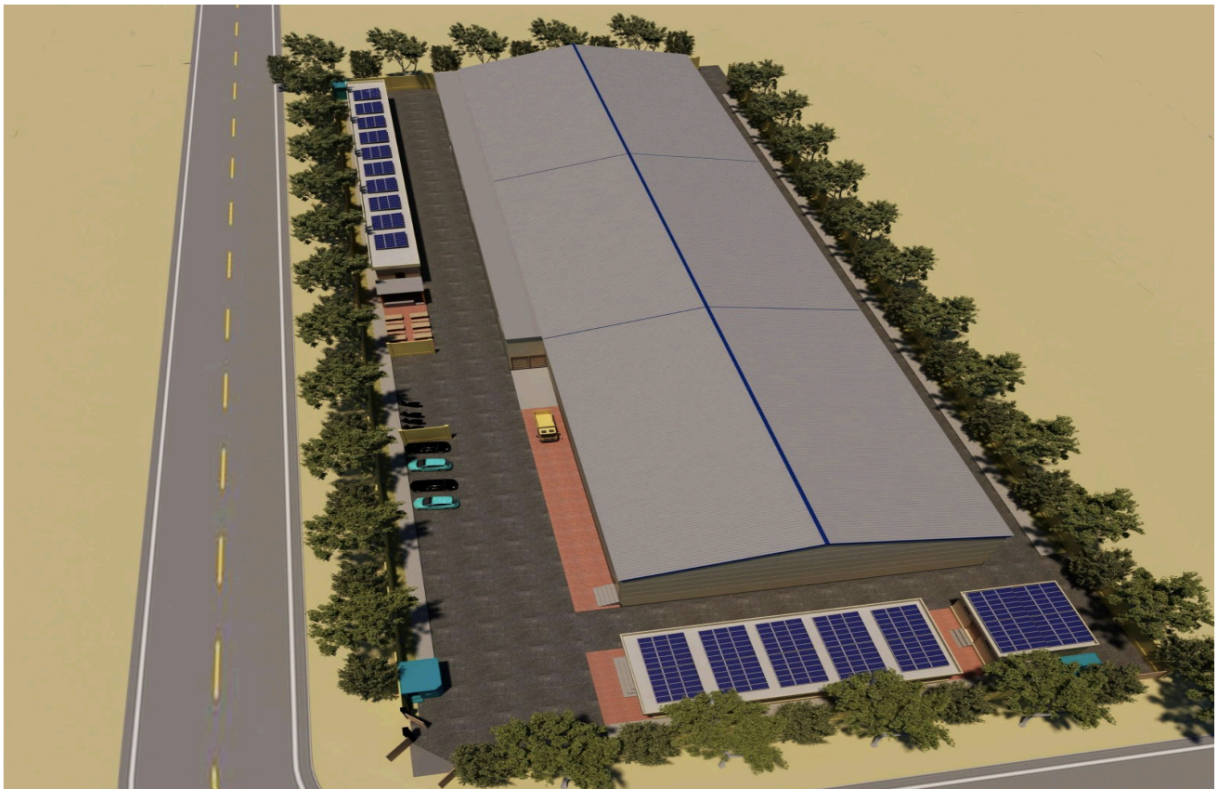
Below figures show 3D views of the facilities and the layout proposal:

3D Views of Facility



3D view of the PE Recycling Facility

3D Outside View of the PE Recycling Facility



Aerial View of PE Recycling Facility

Facility Operational activities

The facility operational activities are divided into three main parts depending on the nature of the specific activity.

S/N	Operational Stages	Process Stages	Description
1	Recycling Stage	Waste Sorting	The collected mixed plastic waste is sorted manually at the conveyor belt. During the sorting stage the polythene plastic bags are sorted out to be processed further for recycling into manhole covers.
		Waste shredding	The sorted polythene plastic bags will be shredded to reduce their size and facilitate further processing.

		Washing and drying	The shredded plastic bags will be cleaned to remove the dirt, dust, negligible quantity of microplastics, and other contaminants through the washing system (float and friction washing system) and then dried for the extrusion process.
		Extrusion and pelletizing	After washing and drying, the plastic bags will go through the melting stage and extrude the shredded plastic, forming the pellets to facilitate handling and further moulding stage.
2	Production Stage	Post Mixture Formulation	Mix the plastic pellets with fillers such as Silica sand and calcium carbonate to create a homogeneous blend that provides strength and will be further processed into manhole covers.
		Post Moulding	The formulated mixture is heated and injected into molds in the shape of manhole covers.
		Cooling and Finishing	Cool the manhole covers in a chiller system and perform any necessary finishing.
3	Packaging & Distribution Stage	Packaging and Distribution	Package the manhole covers for transport and distribution.

Labor Requirements:

The total skilled and unskilled labor required for the construction and operational phases are presented below.

Skilled and unskilled labor for the Construction Phase.

ACTIVITIES	SKILLED	TOTAL	NON-SKILLED	TOTAL
Site Clearance and excavation	Excavator Operator	2	Helpers	4
	Shovel/loader Operator	1		

	Dumper Operator	4		
Construction of PEB Shed	Welder	2	Helpers	10
	Steel Fixer	2		
	Supervisor	1		
	Painter(Anti-rust painting Red-oxide)	2		
	Welder	2		
Ancillary Structures (admin block, storage room, Washroom	Mason	10	Helpers	10
	Shuttering Labor	5		
	Steel Fixer	2		
Installation Of Machinery	Engineers (Electrical & Mechanical)	2	Helpers	8
	Supervisor	2		
	Foreman	3		
TOTAL SKILLED AND UNSKILLED LABOR			33	32

Skilled and unskilled labor for the Operational Phase

ACTIVITIES	SKILLED	TOTAL	NON-SKILLED	TOTAL
Sorting of mixed plastic waste at conveyor belt	N/A	N/A	Informal Sector Men, Women	10
Waste Handler	N/A	N/A	Waste Handler	1

For Overall Plant Operations	Operational Manager	1	N/A	N/A
Health Safety Officer	HSE Officer	1		
Quality Assurance and Quality Control	QAQC Officer	1		
Monitoring & Evaluation	M&E Officer	1		
Safety Guards	N/A	N/A	Guards	2
Office Boy			Office Boy	2
Supporting Staff			Supporting Staff	3
Storekeeper			Store Keeper	1
Electrical Engineer	Electrical Engineer	1	N/A	N/A
Supervisor	Supervisor	1	N/A	N/A
Weighbridge Operator	Weighbridge Operation	1	N/A	N/A
Sweeper	Sweeper(1 Men, 1 Women)	2	N/A	N/A
Total skilled and unskilled workers			9	19

The unskilled labor will be hired from nearby communities within the Hyderabad district to support local livelihood. The local workers will commute on a daily basis. If required during the construction phase; the accommodation will be provided at or near the GTS premises in the form of portable container units which include basic facilities (residence, kitchen, and toilet).

Institutional Arrangements:

AltasPak is responsible for the implementation of construction and operational phases. The institutional arrangements for the construction and operational phases are presented below.

Construction Institutional Flow:

Implementing Party (AltasPak Waste Management)

- Contractor
- Sub-Contractors (Local Companies)
- Labor

Skilled labor

Unskilled labor

The implementing partner for this PLEASE project is AltasPak Waste Management Pvt. Ltd. Although for construction of the facility contractors and subcontractors will be hired.

AltasPak Responsibilities:

AtlasPak, as the implementing partner for the proposed project i.e. PE polythene plastic bags recycling into manhole covers, has responsibilities for the efficient and successful implementation of the project from its execution, construction, and till operationalization.

The key responsibilities based on the project activities are presented below.

1. Collection and transportation of mixed plastic waste

- AltasPak is responsible for the daily collecting and transportation of mixed plastic waste from 4 zones of district Hyderabad.
- AltasPak will ensure efficient routing and logistics for waste collection to minimize costs and environmental impacts.

2. Segregation and Pre-processing

- The separate designated area for the storage of mixed plastic waste at the PE Recycling facility is maintained by AltasPak site officers. It will ensure the manual sorting of polythene shopping bags from other plastic waste.

- After manual sorting, the polythene shopping bags will be prepared for shredding, washing, and other preprocessing tasks.

3. Operation and Management of PE Recycling Facility

- Establishing and managing the facility to maximize the recovery of recyclable polythene shopping bags.
- Ensuring compliance with local regulations and safety standards by the AltasPak HSE officer and Environment expert.
- Exploring and implementing innovative recycling technologies to improve efficiency.
- Minimizing environmental impacts of the recycling operations.
- Ensuring worker safety and compliance with labor laws.
- Addressing social safeguards, especially for workers from vulnerable communities.

4. Collaboration with Regulatory Bodies

- AltasPak will follow the standards and guidelines of the World Bank for construction and operational processes.
- AltasPak will coordinate with the Sindh Solid Waste Management Board (SSWMB), the Government of Sindh (GoS), and the Sindh Environmental Protection Agency (SEPA) for operational approvals and reporting.

5. Community Engagement

- AltasPak will continue conducting outreach programs and awareness sessions to educate the community, schools, hospitals, and industries about the importance of plastic recycling.
- Encouraging source segregation of plastic waste by providing community bins and collaboration with local stakeholders.

7. Reporting and Feedback

- Maintaining detailed records of waste collected, processed, and recycled into manhole cover on a daily basis.

- Providing regular reports to UNOPS, SACEP, and the World Bank by AltasPak Project Manager.

9. Capacity Building

- Training personnel in waste management and recycling best practices.
- Building local capacity for sustainable waste management.

<u>Responsibilities of Contractors:</u>

The Contractors and sub-contractors are responsible for the construction of the PE Recycling Facility to ensure that the infrastructure and facilities are built to meet the project's requirements. The key responsibilities are presented below.

1. Site Preparation and Development

- The contractor is responsible for clearing and leveling the proposed GTS site in accordance with the design specifications.
- The borehole testing, topographic survey, and depth assessments of the site to ensure proper soil stabilization for the construction purpose.

2. Civil and Structural Construction

- Constructing PE Recycling facility key buildings and infrastructures such as PEB Shed, storage areas, administrative offices, Lavatory section, parking area, and worker amenities.
- Erecting structural components such as foundations, walls, roofs, and utility networks.

3. Installation of Machinery and Equipment

- Installing recycling machinery, such as conveyor belts, shredders, washing units, extruder and pelletizing machines, Molding machines, and chiller systems as specified by the AltasPak Project Manager.
- Ensuring the proper alignment, calibration, and integration of mechanical and electrical systems.

- Establishing utility systems, including water supply, drainage, power distribution, and waste management within the facility.
- Setting up safety systems such as fire alarms, extinguishers, and emergency exits.

5. Compliance and Quality Control

- It is the responsibility of the contractors to adhere to local construction regulations, environmental standards, and project specifications set by the AltasPak.
- Contractors will be conducting quality checks and inspections to ensure the construction meets safety, durability, and operational requirements.

6. Safety Management

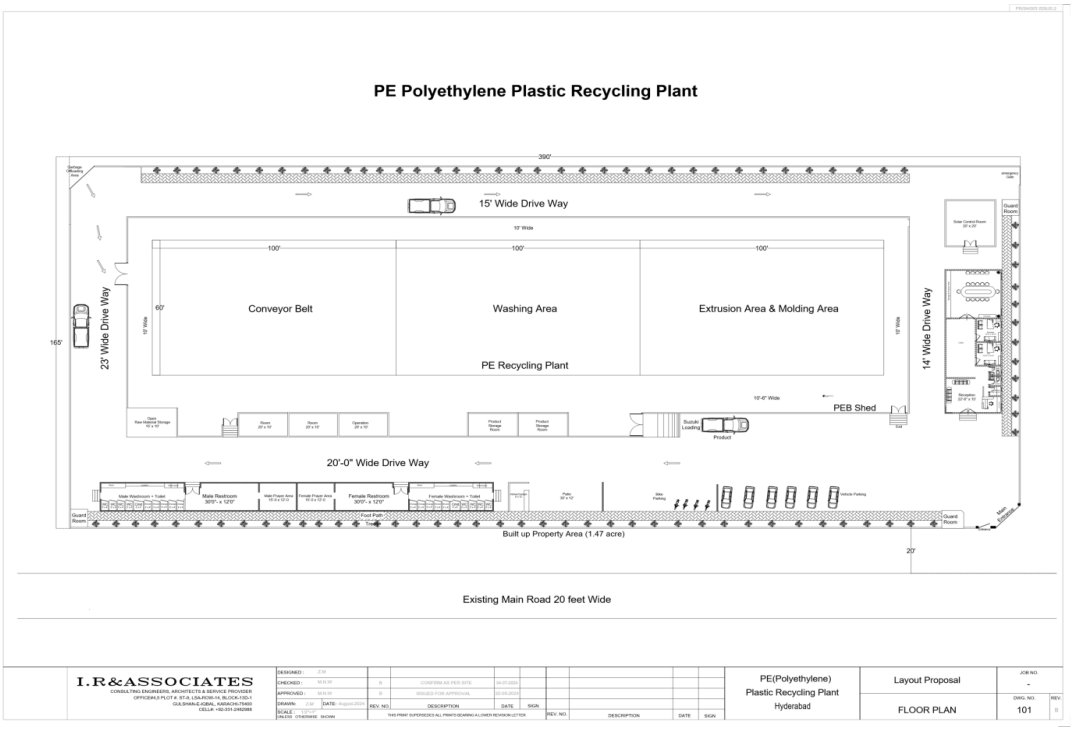
- Implement a recruitment process that is transparent, ensuring workers are hired based on their qualifications, experience, and the specific needs of the PE recycling plant. This includes offering fair wages and clear employment contracts.
- Create a safe working environment by adhering to safety protocols.
- Implement procedures to prevent workplace injuries.
- Monitor the health and safety of workers regularly, ensuring compliance with all OHS regulations.
- Provide regular reports to project management regarding labor practices including safety incidents, worker grievances, and compliance with the LMP. Ensure that any issues or incidents are documented.
- Ensuring all workers adhere to the code of conduct.

7. Coordination with Stakeholders

- Collaborating with project designers, engineers, and the implementing partner (e.g., AtlasPak) to ensure the construction aligns with the project's overall objectives.
- Communicating progress updates and addressing any issues that arise during construction.
- Providing detailed documentation of the construction process, including as-built drawings, equipment manuals, and maintenance guidelines.

Operational Institutional Flow:

- Operations Manager (AltasPak)
- Project Coordinator (AltasPak)
- Environment Expert (AltasPak)
- Monitoring and Evaluation (M&E) Officer (AltasPak)
- Technical Team Lead (AltasPak)
- Health, safety and Environment (HSE) Officer (AltasPak)
- production Officer (AltasPak)
- Supervisor (AltasPak)



Layout Plan of PE Recycling Facility

4. ESMP Matrix: Risk and Impacts, Mitigation, Monitoring

The ESMP for the Construction and operational phase of the sub-project has been prepared and listed below, describing the impacts with their proposed potential mitigation measures and monitoring cost against each proposed measure.

4.1 ESMP for Construction Phase

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Waste generation of approx. 300kg/day as the result of grading and leveling of land and solid waste accumulation (approx. 500 kg/day) during the excavation process such as sand, gravel, stone, etc. The construction process may generate debris, and leftover construction materials during the excavation process. Accumulation of waste may create breeding grounds for mosquitos and pests which may increase the risk of diseases like malaria and dengue. Leachate materials during the excavation process can seep into the ground, leading to soil contamination and loss of soil	Store weed bushes for landfill. Transport and reuse separated topsoil and debris as Foundation fill material. Implement PPE, including N-95 dust masks with PM filters and gloves. Pest control spray at the site to control the incidence of malaria and dengue. Plant 100 trees along the facility's boundary to compensate for vegetative soil loss during the land preparation. The waste generated during the leveling and grading of land will be	at Plant site Daily	Contractor AltasPak site Manager	Waste Generation Volume Pest and Disease Monitoring Waste Disposal Summary from Contractor on a daily basis	**Methodology:** Dust and Debris will be used as backfill material during the construction process and excess waste is transported for proper disposal. **Monitoring period**: Daily basis	AltasPak Environment expert Site Manager Environmental specialist - UNOPS country team for PLEASE project	3,650

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
quality such as pH level, and organic matter. Exposure to waste material can cause health effects such as skin irritation including skin burn and rashes.	transported on a daily basis to landfill sites by using the company's own resources.						
Noise Pollution Excavation and construction activities and operating machinery can produce noise levels up to (60-70 dB). Approx. 60-70 dB of noise during the excavation process for 8 working hours. Noise exposure to workers can affect workers' hearing sense if they exceed the noise level.	Regularly maintaining and tuning of excavation machinery and use of silencer (Pneumatic Mufflers) to reduce noise pollution. Provide ear muffs (NRR-32 corded) for workers to mitigate health risks. Limit construction activities to daylight hours to minimize noise disturbances to nearby informal residents.	at plant site Monthly	Site Contractor Site manager	Noise level **SEQS standards**: Daytime Limits: 70 dB Nighttime Limits: 60 dB Use of PPE by the workers	**Methodology**: Portable Noise-Level meter. Monitoring noise level using a Digital Sound Level device (Extech 407780). **Period:** Monthly Noise Quality Monitoring and submission of Water Monitoring report to SEPA as per Country Compliance.	AltasPak Environment Expert and Site Manager Environmental specialist - UNOPS country team for PLEASE project	1000

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Air Pollution: Dust pollution (30-40 cubic meters of dust) and Particulate Matter (PM10 "50-80 µg/m³" and PM2.5 "10-15 µg/m³) are generated. Dust pollution deteriorates the ambient air quality of the area. Dust leads to respiratory conditions such as asthma and bronchitis and reduced lung function among workers. Dust generated during construction activities can settle on nearby plants, trees, and water bodies such as nallas (drainage channels) and canals.	Use water sprays or dust suppressants during excavation and on soil stockpiles. Cover material stockpiles (e.g., sand, gravel, and excavated material) to prevent dust and particulate matter emissions. Use of proper PPE: such as N95 Masks, Goggles and gloves, and safety shoes.	at Plant site Monthly	Site Contractor ALTAS Site manager	**Air Quality Monitoring** Particulate Matter PM10) and PM2.5 Dust Level Monitoring Use of PPE by workers **SEQS standard Limits:** PM 10: 50–150 µg/m³ over 24 hours PM 2.5: 25–35 over 24 hours	**Methodology**: Dust-Level Monitoring. Portable device Aeroqual Series, will be used for particulate matter (PM10 and PM2.5) and dust level monitoring. **Period:** Monthly	AltasPak Environment Expert and Site Manager Environmental specialist - UNOPS country team for PLEASE project	1,400

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Wastewater Generation: Wastewater approx. (200-350 liter/day) may be produced. The excavation process may generate wastewater which contains sediments. Wastewater may be generated from washrooms or other temporary sanitation setups. Contaminate nearby canals, water channels, and nallas and cause turbidity. Wastewater may contaminate the groundwater after mixing with used oil and grease from construction machinery which may cause diarrhea and gastrointestinal issues. Stagnant and accumulated wastewater may provide breeding grounds to	Regularly monitored and trained the workers to use less water by utilizing high-pressure nozzles for construction activities. The wastewater generated during the construction process will be properly channeled to the nearby open sewerage line to prevent its entrance to the nearby water body. Pest control spray at the site to control the incidence of malaria and dengue. Regular maintenance and tuning of the construction machinery to reduce any accidental leakage of oil, grease, or lubricant.	At Plant site Daily/ Weekly basis	Site Contractor ALTAS Site manager	**Water Quality** Turbidity Sediment level pH level **SEQS Standards Limits:** Turbidity: 5 - 30 NTU Sediment Level: 30 - 50 mg/L pH level: 6.5 - 9.0 Oil and Grease Leve: 5 - 10 mg/L	**Methodology**: Water Quality Monitoring and submission of Water Monitoring report to SEPA as per Country Compliance. **Period:** Monthly	AltasPak Environment Expert and Site Manager Environmental specialist - UNOPS country team for PLEASE project	1,300

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	**Responsibility**	**Parameter to be monitored**	**Methodology, including Location and Frequency**	**Responsibility**	
mosquitoes which cause Malaria and dengue.	Store the liquid waste materials (oils, lubricants or fuels) in leak-proof containers and double-layered containers						
Occupational Health and Safety (handling waste, wastewater, storage piles, lifting and transporting heavy machinery, working at heights on ladders, and exposure to high levels of noise and dust, excavations) Worker incidents include the risks of falling parts, limbs getting caught, and injuries such as burns, eye irritation, and hand wounds. Noise exposure to workers can affect workers' hearing sense.	Train workers in machinery handling. Use of PPEs: helmets, N95 Masks, gloves, suits, safety shoes, and ear muffs. Ensure First aid (Bandages, painkillers, Sterile Gauze Pads and Rolls, Tape, Antiseptic Wipes, and Solutions) and rescue team onsite. Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard	At Plant Site Daily	Project Contractor AltasPak HSE Officer	**HSE Inspections** Record of Safety Talks Record of safety Incidents (Major & Minor) Record of PPEs provided Visual Assessments Availability of guardrails	**Incident Reports**: Record incidents using standardized safety forms, including injury types and severity. **Location:** All work areas especially near machinery zones **Monitoring Period**: Daily/ mock drills weekly	HSE Officer Environmental specialist - UNOPS country team for PLEASE project	13,300 *(12,000 is the HSE officer per year HR cost under this project which is used during construction and operational phases)*

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	Proper use of ladders and scaffolds by trained workers Use of fall prevention devices (safety belt and lanyard travel limiting devices to prevent access to fall hazard areas) Inclusion of rescue or recovery plans and equipment to respond to workers after an arrested fall. Controlling site-specific factors that may contribute to excavation slope instability Providing safe means of access and regress from excavations, such as graded sloped, graded			Use of fall prevention devices Availability of rescue or recovery plan **Standards for PPEs:** OSHA standards of General PPE Requirements (29 CFR 1926.95) under the code of federal regulations is used for the use of PPEs.)			

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	access route, or stairs and ladders						
Community health and safety Health and safety (respiratory and hearing loss) of nearby communities may be affected during the construction phase. Noise pollution may lead to hearing damage in nearby communities, stress, and sleep disturbances. Affecting the respiratory health of nearby communities. Dust may exacerbate respiratory diseases such as asthma and bronchitis, particularly in vulnerable groups such as children, the elderly. Road safety risks	Implement dust suppression measures, such as regular water spraying on exposed soil and construction waste. Cover materials during transportation and storage to prevent dust escape. Monitor air quality around the site and adjust operations if dust levels exceed acceptable limits. Restrict noisy operations to daytime hours to avoid disturbing nearby residents at night. Use low-noise machinery and maintain equipment to minimize noise emissions.	At the Plant Site. Daily	Project Contractor AltasPak HSE Officer	HSE Inspections Air quality records available Record of safety Incidents (Major & Minor). Grievances filed in relation to noise Maintenance record of vehicles available Number of community awareness programs	**Incident Reports**: Record incidents using standardized safety forms, including injury types and severity. **Location:** Nearby informal communities. **Monitoring Period**: Daily/weekly	HSE Officer and Community Outreach Specialist Environmental specialist - UNOPS country team for PLEASE project	1,500

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	Designate specific, clearly marked routes for construction vehicles that avoid densely populated informal settlements. Limit vehicle speeds in community areas and install speed control measures (e.g., speed bumps, and signs). Ensure vehicles are properly maintained to minimize noise and emissions. Implement community awareness programs to inform residents about safe practices around construction zones.						
Risks of Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)	Appoint a PSEA Focal Point at the site.	At Plant Site	Project Contractor	Number of training sessions provided to workers	Monthly site visit	HSE Officer and Community	500

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
between Project workers; and between Project workers and local community members. Risk of abusive behavior faced by the Local action group members during the door-to-door awareness session.	Provide awareness training on recognizing, and preventing SEA/SH for a) Project workers, and b) affected communities. Provide training on the GRM, including for SEA/SH-related grievances to a) Project workers, and b) affected communities. Request all Project workers to sign a Code of Conduct (CoC) including instructions on SEA/SH prevention. Provide specific SEA/SH response mechanisms as part of the Project GRM. The participants involved in awareness sessions should work in pairs, stay calm, and avoid using words or actions that might provoke	Training and awareness will be conducted before the commencement of work Implementation of Focal Points and singing of CoC at the site during the construction period	AltasPak HSE Officer	Number of awareness sessions provided to communities Number of SEA/SH Focal Points appointed Complaint box Actions taken in response to complaints		Outreach Specialist Environmental specialist - UNOPS country team for PLEASE project	

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	negative reactions from the community.						
Non-compliance with the local regulatory requirements and workers' dissatisfaction due to extensive work requirements	Wages will be paid in accordance with the LMP of the project. Prevent all forms of forced labour and child labour. Keep records of the age of all workers. Provide workers' GRM.	Throughout implementation of works	Project Contractor AltasPak HSE Officer	Availability of workers' GRM Availability of records of workers	Monthly site visit	HSE Officer Environmental specialist - UNOPS country team for PLEASE project	200
Inadequate camp facilities and poor conditions can damage the project's reputation and lead to labor unrest.	The portable worker camp facilities will be provided if necessary at the project site. Essential amenities such as electricity, a First aid box, and healthcare services will be provided for the well-being of the workers.	Throughout construction	Project Contractor AltasPak HSE Officer	Availability of essential amenities. Availability of workers' GRM and related complain Availability of records of workers	**Location:** Project site **Monitoring Period**: Daily/weekly	HSE Officer Environmental specialist - UNOPS country team for PLEASE project	200

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	Conduct regular inspections to ensure camp conditions remain hygienic, safe, and conducive to living. A transparent grievance mechanism for workers will ensure that all raised issues will be timely resolved and addressed. Regular engagement sessions will be conducted with workers to gather their feedback and any concerns.						
Lack of responsiveness of GRM	Create awareness of Project GRM among local community	Throughout the implementation of works	Project Contractor AltasPak HSE Officer	Number of awareness sessions held	Monthly site visit	HSE Officer Environmental specialist - UNOPS country team for PLEASE project	200

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Lack of stakeholder engagement, especially vulnerable groups	Implement Project Stakeholder Engagement Plan (SEP)[2]	Throughout the implementation of works	Project Contractor AltasPak HSE Officer	Number of Engagement sessions held	Monthly site visit	Project Coordinator HSE Officer Environmental specialist - UNOPS country team for PLEASE project	300
Total Construction Cost							**23,550**

4.2 ESMP for Operational Phase

[2] SACEP Plastic free Rivers and Seas for South Asia, Stakeholder Engagement Plan, 4 April 2020, accessed at: https://documents1.worldbank.org/curated/en/860141586299639389/pdf/Stakeholder-Engagement-Plan-SEP-Plastic-free-Rivers-and-Seas-for-South-Asia-P171269.pdf

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Air Pollution: Particulate matter (PM2.5: 55 µg/m³, PM10: 85 µg/m³ for 24-hour average), dust (approx. 5-7 cubic meters) and negligible quantity of microplastics will be produced as a result of production processes. **(**Production activities, such as collection, transportation, and manual sorting of plastic waste, as well as the shredding and grinding activities generating dust, particulate matter, and negligible quantity of microplastics) Dust and particulate matter reduce air quality by reducing visibility.	Utilize water spraying for dust control and High-Efficiency Particulate Air filters(HEPA) H13 and H14 to control negligible quantities of microplastic and Particulate matters. Provide workers with PPEs such as gloves, N95 respirators, goggles, and safety shoes. Ensure adequate ventilation in sorting and shredding areas to remove dust and odor. Conduct regular air quality monitoring and health check-ups to protect workers' safety.	At Plant site Monthly	Operations Manager	**SEQS Standard Limits:** **Particulate matter levels:** (PM 2.5 75 µg/m³, PM10: 150 µg/m³, 24-hour average). **Dust concentration level:** (5-15 cubic meters) in sorting and shredding areas Use of PPEs by workers	HEPA Filters H13 and H14 will be used for Air-Quality Monitoring to control microplastics and particulate matter emissions. **Frequency:** Monthly	AltasPak Environmental Expert Environmental specialist - UNOPS country team for PLEASE project	2,200

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Exposure to dust and odors, during the manual sorting process. Risk of respiratory issues such as cough and nausea due to dust and odor.				Records of medical checkups			
Water Pollution: Approximately 3,000 to 3,500 liters of wastewater per day may be generated. (Processes, such as the friction and floated washing of sorted polyethylene (PE) shopping bags generate wastewater.) The wastewater contains suspended solids and plastic fragments that contribute to turbidity in	Conduct regular monitoring of effluent quality for total dissolved solids (TDS), pH, turbidity, and negligible quantity of microplastic concentration to ensure compliance with local discharge regulations. Pest control spray at the site to control the incidence of malaria and dengue. Implement systems (4000 liters/day capacity Wastewater Filtration Plant) that continuously treat and reuse wastewater during washing processes.	At Plant site Monthly	Operations Manager and plant supervisor	**Wastewater Monitoring** The concentration of contaminants (TDS, turbidity. pH and negligible quantity of microplastic concentration) **SEQS Standards Limits:**	**Wastewater Monitoring** Water Quality Monitoring and submission of Water Monitoring report to SEPA as per Country Compliance. **Monitoring Period:** Monthly	Environment Officer Environmental specialist - UNOPS country team for PLEASE project	18,350 (Wastewater Treatment plant: 17,850 USD)

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
nearby water bodies, including nallas and canals. Stagnant wastewater can cause health issues in informal communities, such as malaria and dengue.	Filtration Plant to treat contaminated water containing suspended solid for reuse in dust spraying, gardening, and lavatory purposes.			**TDS**:1500 mg/L **Turbidity:** 5 NTU (Nephelometric Turbidity Units) **pH:** 6.0 to 9.0			

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Sludge production from wastewater treatment plant Sludge generation as a by-product during the washing of PE bags contains dirt, dust and organic matter. Potential contamination of soil and water sources. posing risks to ecosystems and human health.	Sludge will be collected in dedicated settling tanks or sedimentation basins. Install barriers around the washing area to prevent runoff. The collected sludge will be dewater to reduce the moisture level and volume. After the sludge dewatering and drying process, it will be safely disposed of at landfill site on a daily basis.	At Plant site Monthly	Operations Manager and plant supervisor	**Sludge Monitoring** The concentration of contaminants (TDS, Sludge **SEQS Standards Limits:** **TDS:** 1500 mg/L **Sludge:** 100-150 liters/day	Water Quality Monitoring and submission of Water Monitoring report to SEPA as per Country Compliance. **Monitoring Period:** Monthly	Environment Officer Environmental specialist - UNOPS country team for PLEASE project	(Wastewater Treatment plant: 17,850 USD)
Noise Pollution: Noise level of (50-60 db) generated during the	Perform regular maintenance of plant machinery to minimize noise levels.	At Plant site Monthly	Operations Manager	Use of PPEs by workers Work schedule	Noise Level Monitoring Device (Extech 407780 will be used to	Environment Officer Environmental	1,500

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
production process of manhole covers. (Machinery operations such as conveyors, shredders, grinders, washing lines, and other mechanical processes.) May impact workers' hearing. Constant noise exposure can lead to increased stress, fatigue, and decreased concentration thus affecting worker productivity and safety. Noise from machinery can cause headaches, fatigue, and discomfort in workers.	Provide PPEs such as Ear Muffs (3M ™ NRR-32 corded) to the workers prone to working in high-noise areas. Rotate employee shifts to reduce the duration of exposure to high-noise areas. Regular inspection of worker hearing assessment.			Noise Pollution Monitoring **SEQS Standards limits:** Noise level: 65-75 dB	monitor the noise level. **Monitoring Period:** Monthly	specialist - UNOPS country team for PLEASE project	
Solid waste:	Designated waste storage areas for non-recyclable and mixed waste to	At Plant site Daily	Operations Manager	Followed SOPs for Solid	**Solid Waste Management**	Environment Officer	1,300

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Leftover waste heaps at the plant site (non-recyclable waste (200-300 kg/day), mixed solid waste such as leftover food, packaging, and biodegradable materials, general waste including paper, packaging materials, and office waste (approx. 50-60 kg/day). (Sorting operations to remove contaminants from recyclable PE shopping bags; Office and Administrative Activities (Staff Consumption and Lunch Breaks).) Solid waste (leftover waste and debris) will be generated during the production processes.	prevent accumulation in open spaces. Pest control spray at the site to control the mosquitoes. Collaborate with local junk shops to manage non-recyclable waste. Ensure proper disposal of the leftover solid waste on a daily basis by the dedicated AltasPak team. Proper PPE (e.g., N95 masks, goggles, gloves, and safety shoes will be provided to the workers for handling the management of leftover solid waste.			Waste Management Rules (2012) for Solid Waste Management in Sindh Province Amount of non-recyclable waste. Amount of leftover waste. Transportation for proper disposal on a daily basis	report will be submitted to SSWMB as per Contract Compliance **Monitoring Period:** Daily inspection	Environmental specialist - UNOPS country team for PLEASE project	

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Accumulated waste heaps can contribute to soil contamination if liquid content leaches from the waste into the ground. Leftover food and biodegradable materials can decompose and release foul odors. Leftover food attracts insects, pests, and mosquitoes which may cause malaria, dengue, skin irritation, and allergic reactions for workers.							
Resource Consumption: demand for energy (approx. 200 kV) and water consumption(approx. 2 tons/day) for operational processes.	Use energy-efficient equipment and machinery (energy-efficient rotor motors, PLC system, etc). Implement water-saving practices by reusing washing water after the filtration process by using a Filtration Plant of 4000 liters/day to	At plant site Monthly	Operations Manager	Monitoring water and energy consumption as per daily plant	Monitoring Water and Energy Consumption for daily production process to optimize the	Operations Manager Environmental specialist - UNOPS country	500 *(This cost excluding the Recycling Equipment and Solar*

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	**Responsibility**	**Parameter to be monitored**	**Methodology, including Location and Frequency**	**Responsibility**	
(Production processes (from sorting to manhole covers production).) High consumption of water and energy during the recycling process and increased operational costs.	reduce reliance on external water sources. Regular monitoring of energy and water use to identify the areas where consumption can be optimized. Will plan to explore alternative sources of energy such as Solar panels.			operation requirements.	resources consumption **Monitoring Period:** Monthly inspection	team for PLEASE project	*Panel System cost as it is added separately as PE Recycling Plant Cost in GSA).*
Occupational Health and Safety (OHS) for handling of operational machinery. (Such as conveyors, shredders, washing lines, extruders, and molding machines.) Physical injuries to workers from operating heavy machinery cuts, sprains, fractures, back strains,eyes	Ensure a clean and tidy working environment. Strict compliance on wearing/using safety gears such N95 masks, gloves, goggles, safety suits and shoes. All employees will be trained to follow working SOPs and safety gear.	At Plant site Daily in case of any emergency and Weekly for whole staff and workers	Operations Manager	OSHA standards of General PPE Requirements (29 CFR 1926.95) under code of federal regulations is used for use of PPEs.)	**Worker health and safety** Regular inspection of Worker health and safety measures will be taken and ensure the use of PPEs by	HSE Officer Environmental specialist - UNOPS country team for PLEASE project	700

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
and skin irritation (especially during the manual sorting of mixed plastic waste), muscle sprains etc..	Install emergency exit and fire suppression systems (e.g., sprinklers, extinguishers). Conduct weekly mock drills to train workers on safety protocols and emergency response procedures. Providing a first aid kit.			Provision of PPEs (N-95) Mask, gloves, goggles, safety suit and shoes. Fire Extinguisher System. Training records	following OSHA guidelines. **Monitoring Period:** Daily inspection and weekly mock drills.		
Lack of appropriate labor and working conditions among workers	Develop and adopt and implement LMP in alignment with PLEASE project LMP Develop and adapt GRM in alignment with PLEASE project GRM.	At Plant site Throughout operational phase	Operations Manager	Availability of workers' GRM	**Monitoring Period:** Monthly	Operations Manager Environmental specialist - UNOPS country team for	200

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Cost Estimation (USD)
		Location/ Timing/Frequency	**Responsibility**	**Parameter to be monitored**	**Methodology, including Location and Frequency**	**Responsibility**	
						PLEASE project	
Risk of SEA/SH incidents among workers	Prepare CoC with references to zero tolerance of SEA/SH Ensure all workers sign CoC. Create awareness of CoC among workers.	**Location:** Plant site **Timing/frequency:** Throughout operational phase	Operations Manager	Availability of CoC Percentage of workers that have signed CoC Number of awareness sessions	**Monitoring Period:** Monthly	Operations Manager Environmental specialist - UNOPS country team for PLEASE project	500
Total Operational Cost							**25,250**

5.

5.1 Capacity Building and Training Programs for Construction Contractors and Operational Workers

AltasPak will provide specialized training for construction contractors and workers to ensure Environmental and Social Standards (ESS) compliance. This training will cover the correct use of personal protective equipment (PPE), including hard hats, safety goggles, gloves, high-visibility vests, steel-toed boots, and respiratory masks, during excavation and other construction activities to maintain a safe work environment and other OHS issues during the construction works; SEA/SH prevention and response; Code of Conducts; labor and working conditions and workers' GRM. Additionally, the training will guide managing and disposing of construction waste responsibly and operating equipment in ways that align with environmental standards. This initiative aims to promote safe practices, responsible waste management, and sustainability throughout the construction phase.

The training on SEA/SH and gender-based violence will be provided to the operational workers before the start of the operational phase by the AltasPak Gender specialist. During the training, the workers will be aware of the SEA/SH and GBV risks or issues if any raised at the workplace. The workers will be provided with the knowledge of their rights, responsibilities, and reporting mechanisms. They will be informed about how to report the incidents confidentially and without fear of retaliation.

The community of district Hyderabad will be informed and aware of the PLEASE project, its positive impacts on the environment, and how they will benefit by the project. They will be informed about plastic waste pollution and its impacts on aquatic life during the awareness sessions held in four zones of the district Hyderabad.

- Responsible Parties: AltasPak HSE officer and Social Safeguard Expert

5.2 Capacity Building and Training of Production Department

AltasPak will establish a one-year contract with the PE machinery supplier to train the production team on safe handling and efficient equipment operation. The training will provide hands-on

guidance to staff on the skilled operation and maintenance of equipment. The program will include key Standard Operating Procedures (SOPs) and safety protocols for material handling, covering essential practices such as safe loading, unloading, and correct storage techniques to prevent spills and accidents. Workers will also be trained in using personal protective equipment (PPE), including hard hats, safety goggles, gloves, and steel-toed boots, to maintain workers safety. The training will also cover technical instructions on the responsible management of wastewater generated during the washing process, as well as other production waste, to ensure compliance with environmental standards, including the Solid Waste Management Rule 2012, SEQS, and NEQS for water, air, and noise parameters.

- Responsible Parties: Production Manager, HSE Manager

5.3 Capacity Building and training of General staff

AltasPak will implement a comprehensive training program for general staff, concentrating on environmental standards and plastic waste management during the construction and production processes. This program aims to ensure that staff recognize the significance of sustainable practices and are equipped with the necessary knowledge to manage plastic waste effectively within the organization. The training will encompass relevant regulations, including compliance with environmental standards (NEQS and SEQS), best practices for waste reduction during construction activities (such as excavation and site preparation), and production processes (including washing, melting, and molding processes). It will provide a responsible culture of waste handling and processing throughout the project life.

- Responsible Parties: AltasPak HSE officer and Social Safeguard Expert

5.4 Capacity Building and Training for Newly Hired Staff

AltasPak is committed to training newly hired staff to enhance their skills and ensure a clear understanding of environmental safety protocols and regulations during the construction and production processes. The training will cover health, safety, and environmental (HSE) practices, equipping employees with the knowledge to maintain a safe workplace. It will also include

technical capacity-building efforts aligned with project goals, focusing on proper waste management, sustainable practices, and adherence to relevant environmental regulations.

- Responsible Parties: AltasPak HR team , HSE officer

6. Implementation Schedule and Cost Estimates Grievance Redress Mechanism

6.1 Project Schedule

	Months				
	Jan	Feb	March	April	May
Planning (ensure contractors follow robust health and safety protocols aligned with local and international standards; mandate training and capacity building of workers, proper usage of PPEs for workers at project sites).					
Development (Implement Safety measures such as PPEs (N-95 dust masks, ear muffs, safety gloves and shoes); dust control water sprays, pest control spray, wastewater treatment plant, tuning and use of machinery silencers, use of HEPA Filters, LMP and GRM for workers).					
Commissioning (air and noise quality monitoring by ensuring compliance with local and world bank environmental standards, worker health and safety by proper use of PPEs, earmuffs for operators near noisy areas,safety drills and training on machinery handling).					
Operation (Air and noise monitoring according to SEQS and NEQS, workers health and safety, proper use of PPEs, wastewater treatment, proper disposal of non-recyclable plastic waste, LMP and GRM for workers).					

6.2 Cost Estimates

The following is a breakdown of the cost estimate for implementing the mitigation and capacity development measures.

Item	**Estimated Cost (USD)**	**Responsibility**
PPE (initial procurement) for workers	$ 3,800	Operations Manager and HSE Officer (AltasPak)
Waste Management	$ 25,400	Operations Manager and Environmental Officer (AltasPak)
Equipment (HEPA filters, noise silencers, ear muffs and wastewater treatment plant) / services	$ 3,300	Plant Manager (AltasPak)
EHS Officer (per year)	$ 12,000	Operations Manager (AltasPak)
Energy Efficient Equipment	$ 500	Operations and Plant Manager (AltasPak)
Training materials, venue, refreshments, etc.	$1,700	Administrative Staff (AltasPak)
GRM costs	$ 1,100	Social Safeguard Expert (AltasPak)
Community awareness / stakeholder engagement initiatives	$ 1,000	Communication and Outreach Specialist (AltasPak)
TOTAL	**$ 48,800**	

7. Wastewater Treatment Plant

Description:

The proposed Wastewater Treatment Plant will be utilized to treat and filter wastewater generated from the washing process of raw material, where crushed plastic bags are passed through washing lines to remove dust, dirt, microplastics, and residual solvents that may otherwise compromise the quality and may contaminate the recycling process. The proposed wastewater filtration system is directly integrated with washing lines, and continuously treating the used water and recirculating it back into the washing lines after a multi-stage filtration system.

Specifications/Capacity:

At the inception of the project, it was initially estimated that approximately 1,500 liters of wastewater would be generated daily from the washing process. However, following a comprehensive assessment conducted by the Technical Team Lead and the Environmental Expert, it became clear that the incoming raw materials (residential and commercial mixed waste) exhibit a high level of contamination. To achieve the desired quality and refinement of the end-product, a double washing line is already procured.

Based on the double washing line and the additional size machinery increase the washing capacity up to 3,000-3500 liters per day; however, initial analysis of the first sorting recovery of PE shopping bags revealed a high level of contamination, suggesting that over 4,000 liters of water per day may be required for effective washing.
In parallel, Government municipalities (HMC & KMC) have recommended the introduction of a new size 18-inch manhole cover ,which will necessitate additional machinery and could further increase the water demand to approximately 8,000 liters per day. While testing is currently underway to assess contamination levels and microplastic presence in the raw material which is critical for accurately estimating water requirements.

It is worth to note that the filtered water will be reused for the washing process, so decrease the daily consumption of freshwater sources. Further the system is designed to promote the sustainable reuse of water while ensuring compliance with environmental regulations and operational best practices.

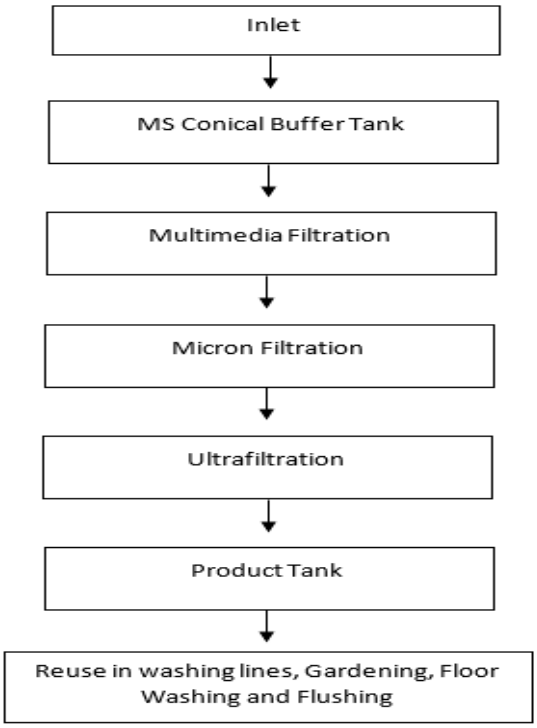
The proposed wastewater treatment plant will feature an advanced and efficient multi-stage filtration system to remove dust, dirt, organic contaminants, and microplastic residues from the wastewater stream. The system is engineered for operational efficiency, minimal maintenance, and optimal water recovery.

The following are the major equipment with key-specifications.

- MS Powered Coated SKID
- Feed Pump

- Multimedia Filter Vessel Material: FRP additionally Top & Bottom Distributors for Vessel Washed Graded Sand Media Washed Graded Gravel Carbon Media.
- Cartridge Filter (Filter Rating 5 Micron and 1 Micron)
- Ultrafiltration (Filter Rating 0.02 -0.1 Micron)
- Electrical Control Panel

Process Flow Diagram:



Filtration Process:

The main activities involved during the wastewater filtration process include,

1. **Water Inlet into Water Tank:** the water discharge from the washing lines is entered into the water settling tank which is of 10 cubic meter capacity. The water is settled in the water tank for approx. 6 hours and from here it is powered to the conical tank of the wastewater filtration system.

2. **Feed Pump:** the water from the conical tank entered into the feed pump, from where the water is pumped into the multimedia and ultrafiltration systems.

3. **Preliminary Filtration:** at initial stage the large particles and debris are removed using initial screening.

4. **Multimedia Filtration**: after initial screening, the water passes through a multimedia filter containing graded sand, gravel, and carbon media to remove suspended solids, dirt, and any organic contaminants.

5. **Cartridge Filtration**: to filter the finer impurities and particulates, the water passes through the cartridge filters (5-micron and 1-micron).

6. **Ultrafiltration:** at the final stage, the water passes through the ultrafiltration membranes (0.02-0.1 micron rating) which remove microplastics,and any remaining contaminants.

7. **Treated Water Collection**: at the process end-the filtered and treated water is collected from the product tank to reuse for washing and other activities at the plant site.

Activities which Utilized Treated Wastewater:

The filtered wastewater, after undergoing a comprehensive multi-stage filtration process, is repurposed for various operational activities within the facility to promote water conservation and sustainable practices. The treated water is reused in the following areas:

- **Washing Lines**: Reintroduced into the floating and friction washing lines to ensure continuous operation while reducing freshwater consumption.

- **Gardening and Landscaping**: Utilized for gardening and green spaces within the facility premises, supporting the maintenance of a clean and eco-friendly environment.

- **Facility Maintenance**: Utilized for floor washing, equipment cleaning, and flushing operations, contributing to hygienic conditions and efficient water use management.

Environmental and Social Risks with Mitigation Measures:

S/N	Risk Type	Description	Potential Impact	Mitigation Measures
Environmental				
1	Water Pollution	Untreated wastewater may contain dirt, dust, solids and microplastics.	This contaminated water discharge into nearby water canals may contaminate the surface and groundwater and may cause harm to aquatic life.	The wastewater generated as the result of the washing process-lead towards the wastewater filtration system before discharge into a nearby canal or water body. Further the treated water is reused in the same washing lines.
2	Soil Contamination	The wastewater accidental discharge or leakage from washing line handling areas.	Degradation of soil and affecting vegetation within the vicinity area of the facility.	The wastewater filtration plant, equipped with multi-stage, leak-proof filtration systems, ensures thorough treatment of water prior to its discharge into nearby water bodies. Additionally, the facility includes integrated spill containment systems, with routine inspections conducted by the Environment Expert, HSE Officer, and Plant Manager to maintain operational safety and environmental compliance.
3	Air Pollution and Odors	Odors may be released from wastewater generated from the washing lines.	This will generate nuisance odors, cause health issues and may deteriorate the air quality.	The proposed wastewater treatment plant will efficiently filter the water using a multi-filtration system in order to prevent odors from forming.

4	Microplastic Release	Fine plastic particles generated during the crushing process may enter nearby water bodies.	Enters the water bodies and may affect the aquatic life and cause environmental pollution.	Incorporate microplastic filtration (ultrafiltration {0.02-0.1 micron}) to filter microplastics and assure quality filtered water.
Social				
1	Worker Health & Safety	Exposure of workers to odor, dust, particulates and microplastics.	Increased risk of respiratory and dermatological diseases.	Provide PPEs such as gloves, masks, safety suits and shoes and provision of first aid kits. The safety training will be provided to the workers by HSE Officers to ensure their health and safety.
2	Community Health Risks	The nearby communities may be exposed to pollutants, pathogens, or odors.	Increased risk of respiratory and dermatological diseases.	Maintain buffer zones; conduct community health awareness sessions and early warning systems for any leakage or spills.

Routine Monitoring and Maintenance:

Plant operation manager, environment expert and plant operator will conduct regular inspection and maintenance of filtration components to ensure the system efficiency and compliance with operational requirements as per the ESMP and local regulatory laws (SEQS and NEQS).

Conclusion:

Based on the information provided, the current installed capacity of our wastewater treatment plant (WWTP) is 4,000 liters per day, while our approximate daily requirement is 3,000-3,500 liters. However, with future expansion plans, including the addition of washing lines, larger machines, and addressing microplastic & contamination level, we anticipate the capacity will need to increase to around 8,000 liters per day. This will require additional funding.

Wastewater Treatment Plant-specification

8. Annex

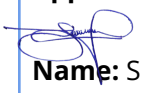
- **Land Document & MOU**
- **NOC from the Building Department**
- **Environment Clearance Document**
- **IEE Report**
- **GRM**
- **LMP**
- **ESS Screening**

The Project will be subject to the Grievance Redress Mechanism implemented by SACEP, as laid out in the Project ESMF (Section 8.2). The implementing partners will actively promote SACEP's GRM at the project site.

Labor Management Procedures

The Project will comply with the Labor Management Procedures prepared for the SACEP PLEASE Project (27 October 2025)

IV. Review & Approval

Prepared by: Samina Perveen **Position:** Environment Expert **Date:** 11-04-2024	
Reviewed By: Nauman Zakariya  **Position:** Technical Expert - Environment **Date:** 11-04-2024	**Approved By**:  Position: Environment and Social Development Specialist PIU-SACEP Date 17.01.2025
Revision 01	
Prepared by: Samina Perveen **Position:** Environment Expert **Date:** 19-05-2025	
Reviewed By: Nauman Zakariya  **Position:** Technical Expert - Environment **Date:** 19-05-2025	**Approved By**:  **Name:** S W Lakshman **Position:** Senior Financial Management Specialist/Officiating Project Director Date 25/09/2025
Revision 02	
Prepared by: Samina Perveen **Position:** Environment Expert **Date:** 22-10-2025	
Reviewed By: Nauman Zakariya  **Position:** Technical Expert - Environment **Date:** 11-04-2024	**Approved By**: Position: Environment and Social Development Specialist PIU-SACEP Date 17.01.2025