YEMEN EMERGENCY HUMAN CAPITAL PROJECT-Additional Financing (YEHCP-AF) P176570)

Environmental and Social Management Plan (ESMP)

for

Rehabilitation of the Sanitation System Including Pipelines, Manholes, Septic Tanks and the WTP in Al-Mahweet City

EHC-PR-WS-MAW-001

26 August, 2024

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Abbreviations

C-ESMP	Contractor Environmental and Social Management Plan
COC	Code of Conduct
CSO	Civil Society Organization
ESF	Environmental and Social Framework of the World Bank
ESHS	Environment, Social (including labor), Health, and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
GBV	Gender Based Violence
GM	Grievance Mechanism
HSSE	Health, Safety, Social and Environment
IDP	Internally Displace Person
LC	Local Corporation
LMP	Labor Management Procedures
MoWE	Ministry of Water and Environment
OHS	Occupational Health and Safety
PMU	Project Management Unit
SCMCHA	Supreme Council for Management and Coordination of Humanitarian Affairs
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
SOP	Standard Operating Procedures
WSLC	Water and Sanitation Local Corporations
W.P.S	Water Pumping Station
TPM	Third Party Monitoring
UNOPS	United Nations Office for Project Services
UW-PMU	Urban Water Project Management Unit
UWSSP	Urban Water Supply and Sanitation project
WASH	Water, Sanitation and Hygiene
YEHCP	Yemen Emergency Human Capital Project
PSEA/SH	Protection from Sexual Exploitation and Abuse/Sexual Harassment
IP	Implementing Partner
LCWSR	The local corporation for water and sanitation Rada'a

Summary Sheet

This sub-project is a part of YEHCP AF subcomponent 2.1: Restoring Access and Improving Quality to WSS Services in Selected Urban and Rural Areas which falls under the component 2: Improving Access to Water Supply and Sanitation (WSS) and Strengthening Local Systems.

Table 1: Summary Sheet

Subproject Name	Rehabilitate the sanitation system including pipelines, manholes, septic tanks and the treatment plant
Subproject Location	Al-Mahweet City - Al-Mahweet Governorate
Implementing Partner	Urban Water Supply and Sanitation Project (UWSSP)
Risk level (low or moderate)	Moderate
Implementation Period	6 Months
Date of the field visit	11 September 2022 (Physical Screening)
Implementation Modality	Directly implemented by UWSSP through Local Contractors
Consultation date	22 of October 2022
Observations/Comments	Indicated below
Signature of responsible ESSO	
Date	

1 Introduction

The Environmental and Social Management Plan (ESMP) for Rehabilitation of the Sanitation System Including Pipelines, Manholes, Septic Tanks and the WTP Project, under component 2 of the Yemen Emergency Human Capital Project (YEHCP - P176570), was prepared in accordance with the Environmental and Social Management Framework (ESMF)) for both the parent project of YEHCP and additional financing (AF). The ESMF was prepared by UNOPS to meet the requirements of the World Bank's Environmental and Social Framework (ESF), UNOPS requirements and the national environmental laws and regulations requirements.

The World Bank is financing the under the provisions of World Bank OP 10.00, paragraph 12, Projects in Situations of Urgent Need of Assistance or Capacity Constraints. The Project will be implemented by the United Nations Office for Project Services (UNOPS), the World Health Organization (WHO), and the United Nations Children' Fund (UNICEF) in which UNOPS will implement Component 2 of the project, in partnership with local Implementing Partners.

The YEHCP ESMF will guide UNOPS and its implementing partners, to ensure that all subprojects are in accordance with the ESF requirements, including the preparation and implementation of subproject specific (ESMP). For this purpose, the ESMF details how UNOPS will screen each subproject to assess its environmental and social risks and impacts, identify the mitigation measures, and monitor ESMP implementation, most particularly the environmental and social performance of project contractors.

UNOPS has in parallel prepared a Labor Management Procedures (LMP) to meet the requirements of ESS2, and a SEA/SH Plan and a Security Management Plan (SMP) to meet the requirements of ESS4, and a Resettlement Framework (RF) to meet the requirements of ESS5, and a Stakeholder Engagement Plan SEP, to meet the requirements of ESS10.

The relevant ESSs for this subproject are ESS1, ESS2, ESS3, ESS4 and ESS10[1]. As a result, this subproject will follow the requirements of the LMP for labor working conditions and OHS, the GBV action plan for any GBV issues and SEP for Stakeholder Engagement

The overall objective of the YEHCP AF is to provide essential health, nutrition, water and sanitation services to the population of Yemen. The targeted services cover four components: (i) Improving Access to Healthcare, Nutrition, and Public Health Services; (ii) Improving Access to Water Supply and Sanitation (WSS) and Strengthening Local Systems; (iii) Project Support, Management, Evaluation and Administration; and (iv) Contingent Emergency Response Component (CERC).

The ESS5 is not relevant because the subproject does not include any land acquisition, restrictions

[1] The relevant ESSs for this subproject are ESS1 (assessment and management of environmental and social risks and impacts, ESS2 Labour and working conditions, ESS3 (Resource Efficiency and pollution prevention and management), ESS4 Community health and safety and ESS10 Stakeholder Engagement and Information Disclosure.

on land use, or involuntary resettlement, also the ESS6[2] is not relevant because the subproject does not include and will not impact any kind of biodiversity or living natural resources; in addition, the ESS7, ESS8, and ESS9 are not relevant because there are no Indigenous peoples in the project area, cultural heritage in the subprojects' area, and the subproject does not involve financial intermediaries. As a result, these subprojects must follow the requirements of the LMP to address labor related risks and OHS, the SEA/SH Prevention and Response Action plan to mitigate against SEA/SH risks, SEP to guide consultations and information disclosure throughout implementation, and the security situation is stable in all of the subprojects' locations so a SMP is not required in these subprojects.

This ESMP will be translated to Arabic and distributed to stakeholders and published on UNOPS and WB websites.

[2] Other standards which are note relevant are: ESS6 (Biodiversity Conservation and the Sustainable Management of Living Natural Resources) because the subproject will not induce biodiversity loss as per the standard; ESS7 (Indigenous Peoples/Sub-Saharan Africa Historically Underserved Traditional Local Communities or IP/SSAHUTLCs) as there are no known communities who meet the criteria of IPs/SSAHUTLCs in the project area; ESS8 (Cultural Heritage), as the project does not impact tangible or intangible cultural heritage, and ESS9 (Financial Intermediaries or FIs) as the project does not involved FIs

2 Sub-Project Description

2.1 Overview

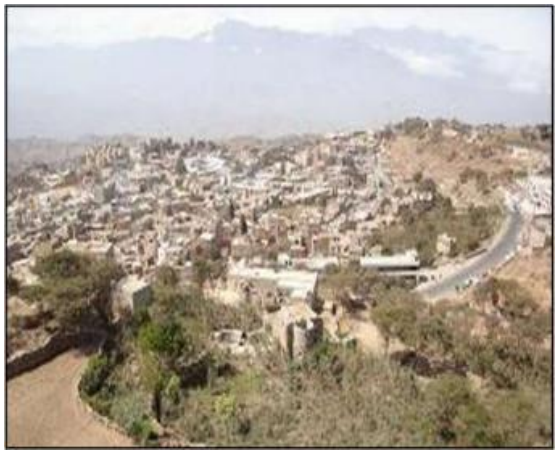
Al-Mahweet City is a mountain town 120 kilometers northwest of Sana'a that rises from the western foothills of the Bilad Al-Ghail mountains. The city is considered as the capital of the Al-Mahweet Governorate as well as the administrative center of the newly established district. Al-Mahweet City has an average elevation of 2170 meters above sea level. It is reachable by a paved road built in the middle of the 1990s that connects Sana'a to the northern coastline Tihama, Hodeidah Governorate, and the Red Sea.

Al-Mahweet is the Governorate's administrative capital as well as the district center. The governorate's overall land area is around 2,300 square kilometers, having one of the highest population densities found in the country. There are 494,557 people living in the governorate overall, of which 248,386 are men and the remaining people are women.

Al-Mahweet is a relatively tiny governorate in Yemen's mountainous north central highlands. It features unique residential architecture, as does most of the western highland region, with many residences sitting on peaks and others nestled in sloping mountain contours. Because of its spectacular features, it is a popular tourist destination.

According to satellite pictures, the entire urban area of Al-Mahweet City is around 3.0 km² (300 acre). About 1.34 km² of residential land area has been developed, and city expansion is predicted to absorb up to 1 km² of agricultural land in the next 20 years.

The city is built on hilltops, and the surrounding region has excellent landscape, making it an appealing tourist destination. Income is mostly sourced from rural activities; there are no big commercial firms. Incomes are often low. The town's economy is further supported by local crafts, market centers, local building materials, and administration services for the surrounding districts. In the last 20 years, there has been a significant expansion beyond the old town.



Existing Sewer System

The center area of Mahweet City features a new sewage system that uses small septic tank components. The system looks to be functioning well, but documents show that the septic tanks have never been de-sludged. There have been multiple reports of sewage flooding into the town.

The municipal system is made up of two types of septic tanks that collect wastewater from residences and discharge it through 100, 150, and 200 mm sewers. The lengths of the current sewer lines are summarized in the table below.

Sewer diameter	Sewer length, m
100	2750
150	4250
200	2500
Septic Tank Type	Number
A (3*6*2.2)	47
B (4*9*2.4)	7

According to the findings of the investigations, all manhole covers are made of medium-duty materials. The manhole covers, on the other hand, appear to be in excellent shape. As a result, no substantial replacement of the coverings is expected in the near future.

Existing off-site sanitation (sewerage & wastewater treatment plant)

The city has a treatment plant (stabilization pond) that was built in 2003. This wastewater treatment plant is located to the south of town, beneath a sloping hill. These ponds are not easily accessible via paved road. The treatment plant does not include anaerobic ponds since the system uses septic tanks to remove the majority of the Suspended Solids and further reduce Biochemical oxygen demand by roughly 50% within the sewage system.

In order, there is one facultative pond and two maturation ponds. The facultative pond is 819 m2 in area and 1.5 m deep, while the maturation ponds are roughly 2175 m2. The first maturation pond has a surface area of 977 m2, while the second has a surface area of 1,197 m2, and both are around 1.3 m deep. The incoming flow rate to the ponds is relatively low due to the low per capita water usage, especially during the dry season. The second maturation pond is totally dry due to the low wastewater flow rate.

Among the treatment processes are septic tank sludge drying beds. The drying beds are rather far from the treatment plant. However, an unpaved road that leads to the drying beds looks to be in better condition than the road to the WTP. The majority of the drying beds are empty.

Existing on-site sanitation

Individual sewage disposal systems are generally made up of percolation pits of varying sizes (one per dwelling). Each pit has an earthy bottom, stone pitched walls, and, on occasion, a concrete cover slab. Because of the unavailability of a suction vehicle, these pits have been in use for a long time and have never been emptied. Due to accumulated sludge, dirt, and rock, water no longer percolates in the pits; their permeability and capability to drain wastewater has severely decreased. Sewage overflows onto the streets as a result of the percolation pit's effective capacity and diminished infiltration capabilities. WWTP design capacity 300,000 m3/year.
Future load when operations (2024) 289,604 m3/year.

2.2 Location

The subproject will be implemented in Al-Mahweet governorate. Coordinates of the Location:

E (Y)	N (X)
15.498575°	43.540964°

Figure 1 Yemen Map shows Al-Mahweet governorate location

Figure 2 Al-Mahweet Governorate map shows Al-Mahweet Citty Location

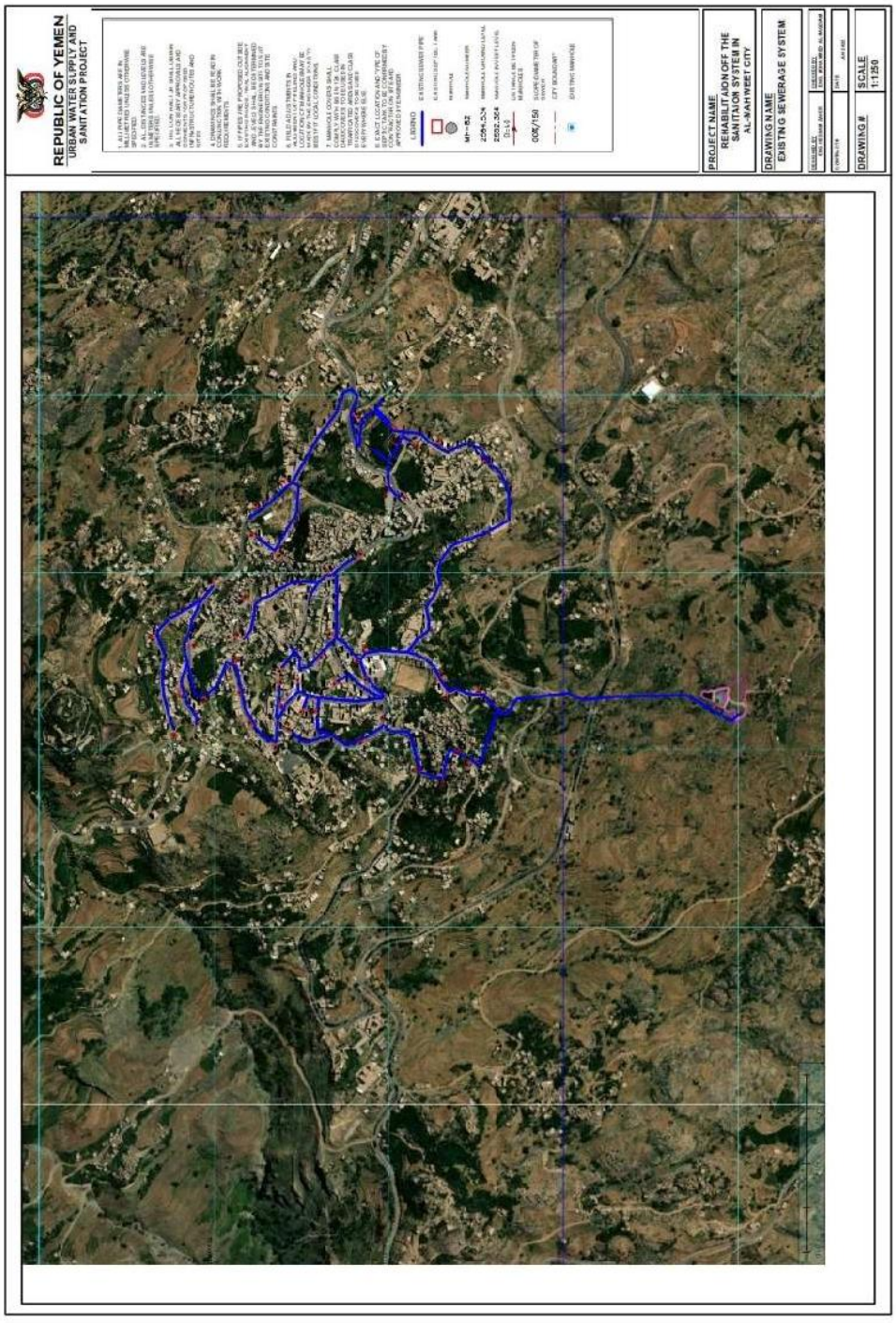


Figure 3 Project Location

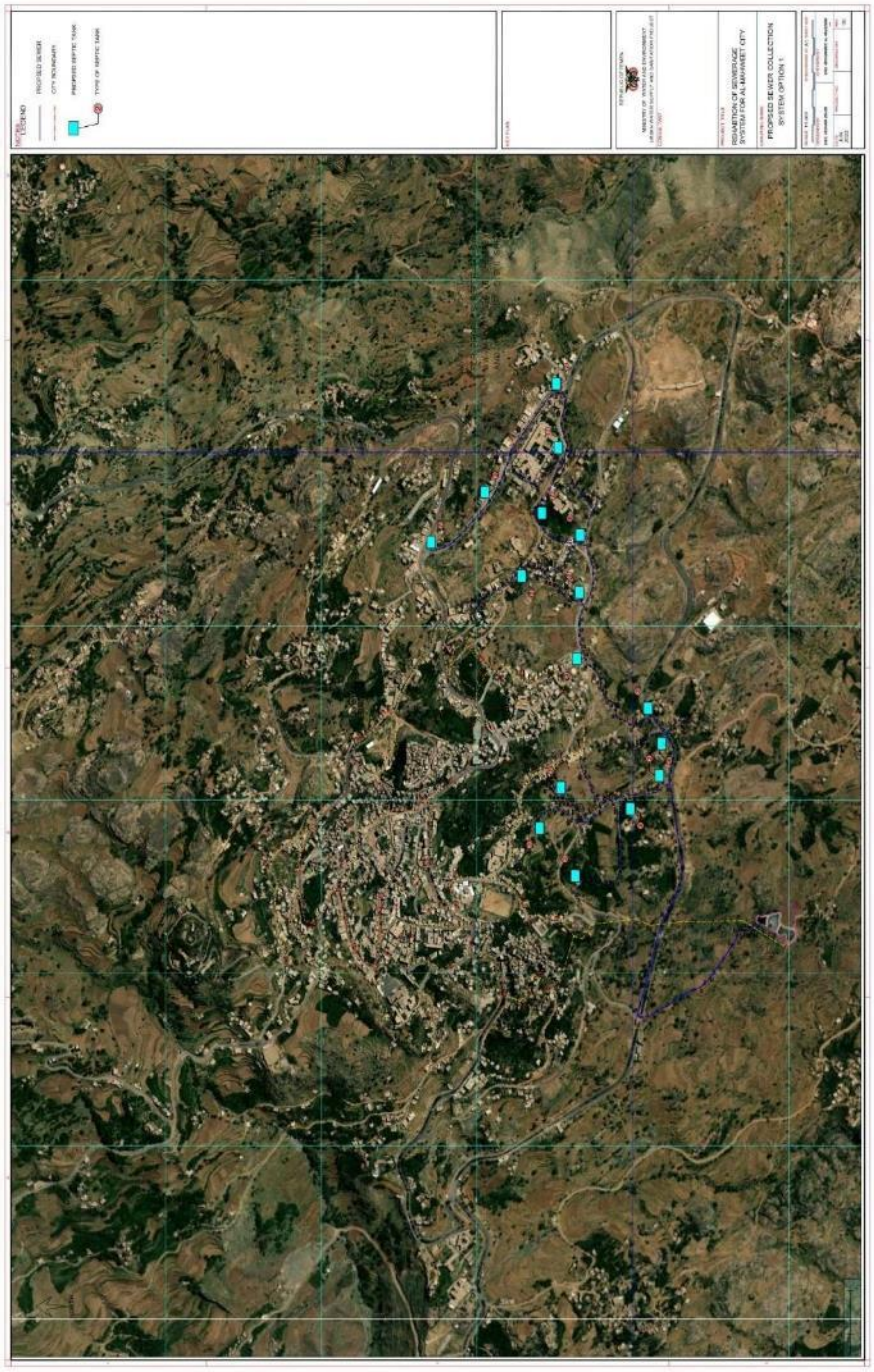


Figure 4 New Sewage (Proposed Septic Tanks)

2.3 Proposed Intervention

The proposed intervention for the Rehabilitation of the Sanitation System Including Pipelines, Manholes, Septic Tanks in Al-Mahweet City Project aims to address the issues with the existing

sewage system and expand the coverage of the sewerage collection system to serve the project districts that are not currently connected.

The key components of the proposed project include:

1. Rehabilitation of the existing sewage system:

    - This involves upgrading and improving the performance of the current sewage system infrastructure.

2. Design of a sewer collection network:

    - The project will design a new sewer collection network to serve the areas not currently covered by the existing system.
    - The sewer collection network will consist of:
    - uPVC pipelines ranging from DN 100, 150 mm to DN 200 mm to collect sewage from houses and convey it to manholes or septic tanks.
    - Sewer main conveyance system of uPVC pipelines ranging from DN 200 mm to interconnect the network.
    - Septic tanks to manage the collected sewage.

3. Expansion of the sewerage collection system coverage:

    - The new sewer collection system is designed to serve the project districts that are not currently covered by the existing sewage system.
    - This will help increase the overall coverage and capacity of the sewerage system in Al-Mahweet City.

The proposed main works include:

- Approximately 5 km of gravity pipes ranging from DN 100, 150 mm to DN 200 mm, along with related accessories.
- Installation of manholes.
- Construction of septic tanks & Wastewater Collection Chamber.

The sewage collection and disposal process can be summarized as follows:

1. Sewage collection from residential buildings:

    - Sewage from households will be collected through house connection chambers and conveyed to the sewer collection network.

2. Sewer collection network:

    - The new sewer collection network will consist of uPVC pipelines ranging from DN 100, 150 mm to DN 200 mm. This network will collect the sewage from the houses and convey it to the manholes or septic tanks.

3. Sewer main conveyance system:

    - The sewer main conveyance system, made up of uPVC pipelines ranging from DN 200 mm, will interconnect the sewer collection network and transport the sewage to the septic tanks.

4. Septic tanks:

- The project proposes the installation of new septic tanks to manage and treat the collected sewage.
- The septic tanks will receive the sewage from the sewer main conveyance system and provide primary treatment before the effluent is discharged.

5. Waste disposal to treatment plant:

- Waste will be discharged from septic tanks to the sewage treatment plant.

The goal of this intervention is to rehabilitate the existing sewage system and expand the sewerage collection network to serve the currently unserved areas, thereby improving the overall sanitation infrastructure and services in Al-Mahweet City.

The following components will make up the Sewerage Collection and ConveyanceSystem:

- A collection system composed of 100,150 mm and150mm uPVC pipelines that collect wastewater from houses via house connection chambers and transport it to manholes or the old and new constructed septic tanks.

Sewer pipes composed of interconnected uPVC pipelines ranging in size from

DN 150, 200 and 300mm to connect the septic tanks to the WWTP. refer to annex3

- Septic Tank
-
- :

The 150mm uPVC pipelines collect sewage from the house connection to the mainline DN 150, 200, and 300mm, the septic tanks are located in the mainline according to annex 3.

2.4 Scope of Work

The scope of work shall include four types of interventions i.e. Rehabilitation of Existing Sewer System, Expansion of Main Sewer Network, Expansion of Branch Sewer Network & Implementation of Septic Tanks. The equipment used in this intervention are as follows:
Machineries and Equipment:

1. Excavators and backhoes for trench digging and pipe laying
2. Pipe laying machines for efficient installation of sewer pipes
3. Compaction equipment, such as vibratory plate compactors, for proper backfilling
4. Sewer inspection cameras and equipment for assessing the condition of existing pipes
5. Specialized tools and equipment for rehabilitation and repair of manholes and pipeline connections
6. Asphalt pavers and rollers for road surface reinstatement
7. Milling machines for removal of existing asphalt
8. Transport vehicles for hauling materials and equipment to the project site

Materials:

1. uPVC (unplasticized Polyvinyl Chloride) pipes in various diameters for the sewer collection network and main conveyance system
2. Precast concrete manholes and covers
3. Cement, sand, and other construction materials for civil works, such as manhole construction and repairs
4. sand and other bedding materials for pipe installation
5. fittings for pipe connections and manholes
6. Asphalt binder, aggregate, and other materials for road surface reinstatement

Chemicals and Consumables:

1. Grout and sealants for pipeline and manhole rehabilitation
2. Fuel for the operation of machinery and transport vehicles
3. Tack coats and emulsions for proper bonding of new asphalt layers

The supplies and work activities related to each type of the intervention are shown in the following table:

Item No.	Description	Unit	Qty
1	**Rehabilitation of Existing Sewer System**	-	-
1.1	This work shall consist of dewatering and cleaning of existing Septic Tanks and Chambers including removal and disposal of sludge and sedimentary solids material to drying beds identified and approved by the engineer and the LWSC/local authorities		
A	6m length ×3m width ×2.2 m depth	LS	47
B	9m length ×4m width ×2.4 m depth	LS	7
1.2	**Basalt Rock** Supply and lay of basalt rock which are scattered everywhere in the intervention land (Riprap Layer) with thickness of 25 cm, and the work shall be implemented with cement mortar ratio of (1:4) (cement:sand) using salt-resistant cement. the proposed interventions for the sanitation system rehabilitation and expansion in Al-Mahweet City do not involve any work in ecologically sensitive zones or areas with known community conflicts. No quarries will be used - the required rocks and aggregates will be manually collected from the surrounding project site. Designated collection zones will be identified, and workers will be provided with appropriate personal protective equipment (PPE) and training to safely gather the materials	m^2	100
1.3	**Silty Clay Soil Layer** Supplying and implementing a silty clay soil layer of a thickness (30 cm), works shall include leveling, compacting, watering and all that is necessary works to finish the works in according to drawings, technical specifications and as directed by the engineer.	m^2	100

Item No.	Description	Unit	Qty
1.4	**Plastering** Plastering of all exterior walls with mixing ratio (1:4) (cement: sand), consisting of two coats, in addition to the initial spray, provided that the final surface shall be smooth and leveled, including all materials and labor required to achieve the finishes instructed in full compliance with the Specification, including surface preparation, all coats on horizontal, vertical and inclined surfaces, working in narrow widths and reveals, forming rebates and other features, curing, scaffolding, beading, stops, metal lathing and all other works necessary for the satisfactory completion of the work	m^2	200
1.5	**Boulder Masonry:** Supply and installation of boulder masonry under the Baffles walls as well as the bottom of the ramp on the oxidation basins' bottom perimeter with dimensions of 40 cm width and 60 cm depth, packing with salt-resistant cement concrete mortar (1:3) and small stones with a size of not more than 20 cm and a percentage of not more than 50% of the total size with good packing and watering, the packing should be on layers.	m^3	10
2	**Expansion of Main Sewer Network**	-	-
2.1	This work shall consist of supplying and delivering of uPVC sewer pipes with working pressure of PN 6, in accordance to DIN 8061/8062, socket spigot with rubber gasket, including storage, transportation and handling of all pipe accessories, with the following Dia:		
A	DN 200	m	2450
2.2	This work shall consist of laying, installing and testing of uPVC sewer pipes, including storage, transportation and handling of all pipe accessories. Work shall include all required trench excavation in all types of soil including rock and all necessary safety and protection works, temporary diversions, backfilling and disposal of surplus material and granular bedding.		
A	Depth 1 m up to 2 m	m	2144

Item No.	Description	Unit	Qty
B	Depth 2 m up to 3 m	m	230
C	Depth 3 m up to 4 m	m	20
D	Depth 4 m up to 5 m	m	24
E	Depth 5 m up to 6 m	m	48
2.3	**Asphalt Reinstatement** Asphalt reinstatement of road to match existing levels. This will include the compaction, watering and preparation of the sub-grade, provision, installation and compaction of 30 cm base course materials as per specifications, provision and installation of MC layer, provision, installation and compaction of asphalt concrete with thickness similar to that before excavation (minimum 5 cm), removal of any excess material and cleaning of site to bring the road to its original elevations and conditions,	m	500[3]
2.4	**Manholes**Supply and construct Pre-Cast / Cast insitu RCC manholes with polyethylene coated iron steps. The works shall include installation of DI frames and covers which will be provided by the LWSC, with clear opening of Dia 600 mm and D-400 in accordance to EN 124. The price shall also include the pipe fittings, channel, benching, accessories and also the excavation in any type of soil, backfilling with appropriate materials and removal of any excess material and cleaning of site to bring it to its original elevations and conditions, all in accordance with the drawings, technical specifications, to the complete satisfaction of the Engineer for the following depths:		

[3] Only 500 m will be asphalted and he rest is not paved area previously and this excavated area will be backfilled and it will be returned back to its original status.

Item No.	Description	Unit	Qty
A	Depth from 1 m to 2 m	No	79
B	Depth from 2 m to 3 m	No	7
C	Depth from 3 m to 4 m	No	3
D	Depth from 5 m to 6 m	No	2
3	**Expansion of Branch Sewer Network**		-
3.1	This work shall consist of supplying and delivering of uPVC sewer pipes with working pressure of PN 6, in accordance to DIN 8061/8062, socket spigot with rubber gasket, including storage, transportation and handling of all pipe accessories, with the following Dia:		
A	DN 200	m	2222
B	DN 150	m	231
3.2	This work shall consist of laying, installing and testing of uPVC sewer pipes, including storage, transportation and handling of all pipe accessories. Work shall include all required trench excavation in all types of soil including rock and all necessary safety and protection works, temporary diversions, backfilling and disposal of surplus material and granular bedding. Price also includes fittings, water, cleaning and flushing, all in accordance with the drawings, technical specifications, to the complete satisfaction of the Engineer, and including other expenses for the following depths:		
A	Depth 1 m up to 2 m	m	2200
B	Depth 2 m up to 3 m	m	111
C	Depth 3 m up to 4 m	m	107
D	Depth 4 m up to 5 m	m	36

Item No.	Description	Unit	Qty
3.4	**Manholes** Supply and construct Pre-Cast / Cast insitu RCC manholes with polyethylene coated iron steps. The works shall include installation of DI frames and covers **which will be provided by the LWSC**, with clear opening of Dia 600 mm and C-250 or D-400 in accordance to EN 124. The price shall also include the pipe fittings, channel, benching, accessories and also the excavation in any type of soil, backfilling with appropriate materials and removal of any excess material and cleaning of site to bring it to its original elevations and conditions, all in accordance with the drawings, technical specifications, to the complete satisfaction of the Engineer for the following depths:		
A	Depth from 1 m to 2 m	No	107
B	Depth from 2 m to 3 m	No	2
C	Depth from 3 m to 4 m	No	2
D	Depth from 4 m to 5 m	No	1
D	Depth from 5 m to 6 m	No	2
4	**Implementation of Septic Tanks**		-
4.1	**Type 1 - Number of Tanks (2)**		-
4.1.1	This work shall consist of excavation and disposal of all materials, of any description or type of soil and rock, up to the designing level,	m^3	122.96
4.1.2	This work shall consist of supply, placement and compaction of base course layer with appropriate material approved by the engineer with thickness of 20 cm.	m^3	5.2
4.1.3	Supply and placement of a layer under the septic tank made of clear small rocks bonded together by cement mortar with thickness of 20 cm and pouring an ordinary concrete layer with thickness of 10 cm and mixing ratio of (1:2.5:5). All works shall be according to specifications and as directed by the Engineer.	m^3	5.2

Item No.	Description	Unit	Qty
4.1.4	This works shall consist of supplying, casting and curing of reinforced concrete (using sulphate resistant cement) for foundations, bottom and top slab, grid beams and where necessary with bitumen joints and concrete joint.		
A	Class C35 concrete for foundation, bottom and top slab, and grid beams.	m^3	18
4.1.5	Supply and construction of the tank wall using reinforced hollow blockwork, and works shall include filling the hollow voids with C30 concrete reinforced with a T12 bar doweled 100 mm into the base slab and continuing to within 100 mm from the top the wall.	m^2	73.92
4.1.6	**Plastering**Plastering of all exterior walls with mixing ratio (1:4) (cement: sand), consisting of two coats, in addition to the initial spray, provided that the final surface shall be smooth and leveled,	m^2	192
4.1.7	**Sulphate Protection** Supply and apply of three coats of bituminous protection to: a) Upper Surface of blinding Concrete b) External Surface of walls and Base Works shall include all other works necessary for the satisfactory completion of the work,	m^2	103.68
4.1.8	**Wastewater Collection Chamber: (They are critical components that ensure the efficient and controlled movement of wastewater through the collection and conveyance network.)** Supply and construction of wastewater collection chamber 20×20×40 cm with polyethylene coated iron steps. ,.	No	8

Item No.	Description	Unit	Qty
4.1.9	**Gravel Filter Media** Supply and placement of gravel filter media of size 20 to 25 mm in the up flow filter unit of septic tank. Works shall include all other works necessary for the satisfactory completion of the work,	LS	2
4.2	**Type 2 - Number of Tanks[4] (6)**		-
4.2.1	This work shall consist of excavation and disposal of all materials, of any description or type of soil and rock, up to the designing level, and shall be executed in conformance with grades, thicknesses and typical sections specified in the contract documents.	m^3	589.68
4.2.2	This work shall consist of supply, placement and compaction of base course layer with appropriate material approved by the engineer with thickness of 20 cm.	m^3	29.484
4.2.3	Supply and placement of a layer under the septic tank made of clear small rocks bonded together by cement mortar with thickness of 20 cm and pouring an ordinary concrete layer with thickness of 10 cm and mixing ratio of (1:2.5:5).	m^3	29.484

[4] The subproject will be implemented in a sufficient land already owned by the government to complete the construction works, so there is no land acquisition impact under this subproject as it is located on public land and there is no potential impact of encroachment on this land, and there will be no resettlement or displacement under this sub-project.

Item No.	Description	Unit	Qty
4.2.4	This works shall consist of supplying, casting and curing of reinforced concrete (using sulphate resistant cement) for foundations, bottom and top slab, grid beams and where necessary with bitumen joints and concrete joint.		
A	Class C35 concrete for foundation, bottom and top slab, and grid beams.	m^3	79.2
4.2.5	Supply and construction of the tank wall using reinforced hollow blockwork, and works shall include filling the hollow voids with C30 concrete reinforced with a T12 bar doweled 100 mm into the base slab and continuing to within 100 mm from the top the wall.	m^2	332.64
4.2.6	**Plastering** Plastering of all exterior walls with mixing ratio (1:4) (cement: sand), consisting of two coats, in addition to the initial spray, provided that the final surface shall be smooth and leveled, including all materials and labor required to achieve	m^2	858.72
4.2.7	**Sulphate Protection** Supply and apply of three coats of bituminous protection to: a) Upper Surface of blinding Concrete b) External Surface of walls and Base Works	m^2	427.44
4.2.8	**Wastewater Collection Chamber** Supply and construction of wastewater collection chamber 20×20×40 cm with polyethylene coated iron steps.	No	24

Item No.	Description	Unit	Qty
4.2.9	**Gravel Filter Media**Supply and placement of gravel filter media of size 20 to 25 mm in the up flow filter unit of septic tank.	LS	6

3 Environmental And Social Baseline

Yemen is divided geographically into four main regions: the coastal plains in the west, the western highlands, the eastern highlands, and the Rub' al Khali Desert in the east. The targeted subproject is located in ruggy, mountain areas.. The benefits of this sub-project include protecting the urban area from environmental pollution, raising the income of beneficiaries, and raising the health situation in the area which are applicable to the sanitation network interventions to be implemented. The sub-project will be implemented in Al-Mahweet City.

3.1 Climate and Weather

Al Mahweet City, 120 kilometers west-northwest of Sana'a City, is located on a peak in the Bilad Ghail mountain range at a height of 2,170 m AMSL. During the October- April season, the city region is often described as a mountain zone with above-average rainfall and significant seasonal fog. In the absence of Climatic Authority specific records and data for Mahweet City, extrapolated data from Hajja city 50 kilometers to the north at nearly the same height and similar geographic characteristics imply the following meteorological conditions. The table highlights some climatic data for Al Mahweet. The average annual rainfall in Mahweet is around 500 mm/year.
The theoretically anticipated range of evaporation- transpiration rates for highland and western Yemen regional areas is 1500 to 2500 mm/year. Winter temperatures are consistent with firsthand observation, ranging from 7-10 °C at night to daily highs in the low 30s °C. During the summer, temperatures range from 12-14 °C at night to the mid-high 30's °C during the day.

Climate Parameters	Jan-Mar	Apr-June	July-Sept	Oct-Dec	Total
Temperature, °C					
Max	29.7	36.2	34.9	31.9	**33.2**
Min	10.6	11.6	15.2	7.0	**11.1**
Mean	20.1	23.9	25.1	19.5	**22.15**
Rainfall, (mm)	14.2	229	299	5.4	**547.7**
Wind speed (m/s)	5.1	5.6	5.5	5.9	**5.5 m/s**
Direction	SW	SW	SW	SW	
Relative Humidity; %	63%	55%	66%	58%	**Avg. 61 %**
Evaporation / transpiration, mm/year					**1,750**

3.2 Air Quality and Noises

There is a severe lack of information on the state of the air in Yemen in general and in the sub-project area in particular. There was no air quality monitoring data for the sub-project area found.

During the field visit, numerous sources of air pollution have been observed. Emissions from diesel generators and vehicles, additionally dust generation as result of vehicles passing on un-asphalted roads.

Diesel generators and traffic movement are a source of noise in the sub-project location.

3.3 Topography

Fifty-three percent (53%) of the Al Mahweet Governorate territory falls under the Wadi Surdud catchments, 30 percent within the Wadi La'ah catchments, and 17 percent within the Tihama catchments. The drinking water supply development for Al Mahweet is mainly in Wadi La'ah sub-catchments. The town is encircled by mountains. Al Mahweet's urban center is located at elevations ranging from 1,920 m to 2170 m amsl.

Mahweet Governorate is recognized as one of Yemen's most fertile geographical areas. It's known for its gorgeous traditional towns and communities located atop peaks and along steeply sloping mountain slopes. These mountains, which include the well-known Jabal Hufash, Jabal Milhan, and Belad Ghail, rise to 2,800 meters above sea level and are typically covered in vegetation and lined with springs and seasonal streams. Numerous wadis (water run-off routes) cross the governorate as they meander westward through the Tehama coastal desert zone on their way to the Red Sea, including Wadi Sare'a, Wadi Lah, and others. Al Mahweet's considerable natural richness contributes in the maintenance of a robust agricultural basis. Because of the region's above-average yearly rainfall, it has a diversified agricultural cropping, including coffee, tobacco, a full range of garden / table vegetables, and tropical fruits. It is also a wonderfully appealing tourist region for rest and enjoyment because of the fresh high-altitude air, magnificent valleys and mountains, and reasonable hotel, accommodation, and related shops.

Al Mahweet City today is spectacularly located on a large mountain crest at roughly 2,200m AMSL.

3.4 Geology

The Cretaceous Tawilah Sandstone, a cemented pebbly sandstone that overlies rocks of the Amran Group, a limestone series that constitutes the lower-level bedrock: all main wadi channels are carved through the limestone. The terrain is heavily fractured and faulted along NW-SE lines; faulting regulates the wadi lines and there are preserved lavas in the S-SW. Contacts between lava and limestone may determine spring discharge locations. The Tawilah Sandstone is often unsaturated due to its high elevation (about 2,000 m amsl). Unless inhibited by low permeability layers, recharge to the sandstone normally goes out as perennial springs. Good recharging conditions do exist inside the limestone aquifer at low level wadi locations, offering some development possibilities.

3.5 Hydrology

The aquifers in the subproject area are represented by three main aquifer units: The Quaternary alluvium (Quaternary Age), the tertiary Volcanic (Tertiary Age) and the Tawillah Sandstone (Cretaceous Period) aquifers. The groundwater depths and location are determining the aquifer. Where the layer of the Quaternary Deposits is large enough to reach a thickness of 300 meters in the middle of the lowland area of the basin. This layer is followed by either the Tertiary volcanic aquifer or Tawillah Sandstone aquifer that reach depths up to 400 m. The average depth of groundwater in the city is 185 meters. There is no surface water in the vicinity of the intervention areas.

3.6 Biodiversity

Endemic, near-endemic and threatened species of plants and animals are not existing in the sub-project area. There are no important habitat protectorates near to the intervention area.

3.7 Archeological Sites

Except for an ancient fort that remains encircled.by protective ramparts and tall observation towers, there are no archaeological sites of any type in the intervention area. The old Al Mahweet and the Al Masna Mountain Fortress loom above the city, each with its own distinct architectural style of whitewashed, stone and mud multi- story buildings that frequently stretch 7-10 levels high Al Mahweet, being the governorate capital, serves as the principal market town for a large number of neighboring towns and communities.

3.8 Socioeconomic aspects:

3.8.1 Economy

Agriculture is the main economic activity in the governorate, which produces about 2.2% of Yemen's total agricultural production. Crops include cereals, cash crops, and fruits. The governorate also produces honey and is home to artisanal pottery, glass, marble, and granite production. There are a number of tourist attractions and historic landmarks, such as the cities of Shibam and Kawkaban.

In 2014, grants and central subsidies constituted 97% of the local authority's budget, while local revenues accounted for 3%. The most significant local revenues were local shared revenues and taxes (most notably zakat), revenues from sales of goods and services, and fines and penalties. The war disrupted economic activity and decreased these revenues.

In 2014, the poverty rate in Al-Mahwit was 60.7%. With the economic decline the governorate has been facing due to the war, this rate is likely to have risen sharply during the past few years. The intervention area is surrounded by 17 business shops and around 430 residential properties. They won't be impacted

by the intervention, though, because there is more than 20 meters separating the nearest shop or residence from the construction path.

3.8.2 Population

Local authorities and census statistics from 2004 estimate the overall urban population to be 12,952 people, out of a total district population of 20,134 people. In 1994, the municipal population of Al Mahweet City was found to be 9,060 people, accounting for over 45 percent of the entire district population. At the time, there were 1,340 houses and 1,320 families listed inside the city's designated urban area.

According to the 2004 census, the Mahweet Governorate, of which Al Mahweet City area is one of nine districts, has a population of 495,045 people, with a 2.87 percent annual growth rate. Al Mahweet has a population density of 212 people per square kilometer. The 2004 census identified 8 urban zones / neighborhoods with a total municipal population of 12,942 people and an annual growth rate of 3.06 percent, which varied between 0.69 percent and 4.75 percent but was averaged out based on growth rate formula estimates .The projection of population in 2024 is 25311 and all of these people will be connected to the new system Table 1.2 highlights Al Mahweet town's population, number of families, and number of dwellings between 1994 and 2004.

Mahweet City Reference Population

Al Mahweet City	2024	2004	1994	Growth Rate
Population	25,311	12,942	9,060	**3.06 %**
Families	3,411	1,793	1,320	**3.11 %**
Housing	3,164	1,779	1,340	**2.87 %**

Al Mahweet City's entire projected urban area is around 3.00 km² (3005 acre), of which 1.34 km² is built up residential land area; city growth is expected to devour another 1.0 km² in the next 20 years.

Population Projections

During the ten-year baseline period, 1994-2004, Al Mahweet City experienced only 3.06 percent annual growth, resulting in a population rise from 9,060 to 12,942 recognized persons. In 2004, there were 1,779 houses and 1,793 families counted, with an average of 7.22 people per direct family.

Based on the yearly growth rate of 3.06 percent and starting with the 2004 census population (12,942), the Al Mahweet City resident population for 2005 was expected to be 13,338 people. The average municipal area population density is expected to rise from 43 people per hectare in 2004 to 90 people per hectare by 2025. Al Mahweet city's population is predicted to grow in five-year intervals

Population Projection up to 2035

Al Mahweet City	2004			2010			2015			2020			2035		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T

Population	7,059	5883	12,942	8,460	7049	15509	9,835	8197	18032	12,188	10158	22346	16,378	13649	**30027**
Families	1,793			2153			2504			2911			**3385**		
Housing	1,779			2132			2479			2882			**2351**		

From 1994 to 2004, the Mahweet population grew at a pace consistent with the Central Statistical Organization of the Ministry of Planning and International Cooperation.

During this time, the population grew at a 3.06 percent annual rate. This rate was used to forecast the population up to the design horizon period. Table 1.23 shows the calculated PGR for the various zones and anticipated population.

When planning for improvements or extension of public services, it is critical to anticipate potential future population increase. The projections are based on the assumption that recent trends would continue in a linear way until the year 2035. Thus projections are based on the assumption that 2004 percentage growth will remain relatively constant throughout the design period.

4 Environmental and Social Screening Process Applicability:

4.1 Environment and Social Responsiveness

The sub-projects are responsive to the environment and social criteria according to YEHCP ESMF, and all the environmental and social impacts are limited to the scope of the sub- projects areas /activities and can be mitigated as provided in section7.

4.2 Applicability of Implementation

Based on risks assessment, the sub-projects may trigger some HSSE impacts such as Occupational Health and Safety impact. and HSSE impacts were considered in the design, tender documents and bill of quantities and the mitigation measures will be implemented.

4.3 Eligibility:

These sub-projects are eligible for support because they do not have any of the attributes in the following exclusion list, which is presented in Table 2.

Table 2 : Exclusion List

#	Question	Answer	
		Yes	No
1	Production or activities involving harmful or exploitative forms of forced labor/harmful child labor;		X
2	Production or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements;		X
3	Production or trade in weapons and munitions;		X
4	Gambling, casinos and equivalent enterprises;		X
5	Trade in wildlife or wildlife products regulated under CITES;		X
6	Production or trade in radioactive materials;		X
7	Production or trade in or use of un-bonded asbestos fibers;		X
8	Production or trade in wood or other forestry products from unmanaged forests;		X
9	Production or trade in products containing PCBs;		X
10	Production, trade, storage, or transport of significant volumes of hazardous chemicals, or commercial scale usage of hazardous chemicals;		X
11	Production or trade in pharmaceuticals subject to international phase outs or bans;		X
12	Production or trade in pesticides / herbicides subject to international phase outs or bans		X
13	Production or trade in ozone depleting substances subject to international phase out;		X
14	Production or activities that impinge on the lands owned, or claimed under adjudication, by indigenous peoples, without full documented consent of such people.		X
15	Landfills and waste transfer stations,		X
16	Power plants,		X
17	Large-scale transport infrastructure such as highways, expressways, urban metro-systems, railways, and ports,		X
18	Investments in extractive industries; commercial logging,		X
19	Dams, or projects involving allocation or conveyance of water, including inter-basin water transfers or activities resulting in significant changes to water quality or availability,		X
20	Activities that would convert natural habitats or significantly alter potentially important biodiversity and/or cultural resource area,		X
21	Activities that would require the relocation of residential households and/or significant involuntary land acquisition,		X
22	Activities in disputed area.		X

5 Environmental and Social Screening

Environmental and social screening was conducted using the YEHCP ESMF screening form, which is provided in Table 3. The sub-projects activities do not involve activities that have a high potential environmental and social impacts.

OHS, Environmental and Social and requirements for prevention measures will be included in the contract and tender documents in order to not cause disturbance to the community.

The environmental and social impacts will be positive upon completing the implementation of subproject activities that will ensure the residents of the city are not suffering from the sewage overflow, which helps in sustaining people's welfare. .

Table 3 : Environmental and Social Screening Form

Question	Answer		ESS relevance	Due to diligence/ Actions
	Yes	No		
Does the sub-project involve civil works including new construction, expansion, upgrading, or rehabilitation of existing infrastructure?	X		ESS1	ESMP, SEP
Does the sub-project involve the land acquisition and/or restrictions on land use?		X		
Is the sub-project associated with any external waste management facility such as a sanitary landfill, incinerator, or wastewater treatment plant?	X			
Does the sub-project have an adequate system in place (capacity, processes, and management) to address waste?	X		ESS1, ESS3	ESMP
Does the sub-project involve the recruitment of workers including direct, contracted, primary supply, and/or community workers?	X		ESS2	LMP, SEP, ESMP
Does the sub-project have appropriate OHS procedures in place and an adequate supply of PPE (where necessary)?	X		ESS2	LMP, ESMP
Does the sub-project have a GM in place, to which all workers have access, designed to respond quickly and effectively?	X		ESS10, ESS2	SEP, LMP
Does the sub-project involve the use of security or military personnel during the construction and/or operation of the related activities?		X		ESMP, SEP
Does the Sub-project establish and implement an appropriate quality management system to anticipate and minimize risks and impact that services may have on community health and safety?	X		ESS4	ESMP, SEP
Does the sub-project apply the concept of universal access were technically and financially feasible?	X		ESS4	ESMP, SEP
Is the sub-project located within or in the vicinity of any ecologically sensitive areas?		X		ESMP, SEP

Question	Answer		ESS relevance	Due to diligence/ Actions
	Yes	No		
Is the sub-project located within or in the vicinity of any known cultural heritage sites?		X		ESMP, SEP
Do the sub-project area present potential Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) risk?	X		ESS1, ESS4, ESS10	ESMP, SEP/GBV Action Plan

Implementation Arrangements

The roles and responsibilities of key role players under Project Management are given in the table 4

Table 4: Roles and Responsibilities of Key Role Player for Implementation of ESMP

Position	Responsibility	The organization
Project Manager	▪ Ensure ESMP Implementation; ▪ Supervise procurement and hiring of staff; and ▪ Overall supervision of project.	▪ Implementing Partner (UWSSP)
Environment and Social Safeguards Officer (assisted by Implementing Partner supervision consultant (Supervisor) and contractor HSSE officer)	**Environmental Aspects** ▪ Ensure that the contracts include clauses for ESMP implementation; ▪ Ensure implementation of the ESMP during variousphases of design and implementation; ▪ Certify timely and robust environmental monitoring in the field by local facilitators and technical resource persons; ▪ Ensure that environmental trainings are planned and implemented; ▪ Overall monitoring and reporting of environmental impacts; ▪ Coordinate and ensure development of awareness material; ▪ Prepare environmental Progress Reports including monitoring reports for the project. ▪ Monitor and check the proper implementation of all occupational health and safety mitigation measures as suggested in ESMP through field visits as well as site records; ▪ Ensure that environmental trainings regarding occupational health and safety are planned and implemented; ▪ Overall monitoring and reporting of occupational health and safety issues; and ▪ Prepare Progress reports regarding compliance of mitigation measures for occupational health and safetyfor the project.	▪ UNOPS

	Social Aspects ▪ Monitor and check the proper implementation of all social mitigation measures as suggested in ESMP; ▪ Monitoring and evaluation of social related matters of the project and maintain a social complaint register to document social issues; ▪ Certify timely and robust social monitoring in the field by local facilitators [5](Part of the local community) and technical resource persons ▪ Ensure inclusion of ESMP requirements in project designs; ▪ Remain the focal point for managing the project GM, and maintain analysis and reports on types of complaints received, resolved, time taken to action, etc. Provide technical lead to the field teams regarding gender mainstreaming activities of the project; ▪ Linkages development with NGOs and public-sectorentities working on empowerment of women and marginalized segments of society; ▪ Ensure the GM is gender friendly; ▪ Provide assistance and advice to field staff (the contractor's workers) for resolving grievances related to gender arising on account of project implementation; and ▪ Prepare Grievance Reports as and when required	
Site Supervisor (Supervision Consultant)	▪ Assist UNOPS ESSO in managing and monitoring all HSSE related activities on the ground	▪ UWSSP
HSSE Officer	▪ Performing all HSSE activities on the ground including toolbox, training, inspections, reporting and etc.	▪ Contractor
Designing Engineer	▪ Coordination to provide technical data and information for UWSSP designer engineer ▪ Participation in the inspection of supplied materials. ▪ Provide facility in supervision the project's activities (Coordination to enable the contractor to commencing work) ▪ Provide information on the Project 's progress ▪ Participation in the primary receipt of implemented project activities form the contractor ▪ Evaluation project technical performance ▪ Participation in the final receipt of implemented project activities form the contractor	▪ UWSSP

[5] The role of a project social facilitator is managing stakeholder engagements at all project levels, preferably from the design phase through to project completion. This entails identification of all stakeholders whose interest / influence would have an impact on successful project implementation.
And also assist in undertaking project feasibility, and facilitate of Local Community participation in the project

	▪ Coordination to remove waste and debris from working sites to the assigned landfill ▪ Coordination to organize and facilitate traffic movement	
TPM	▪ Evaluation of ESMP implementation; ▪ Supervision of implementation contractor; and Reporting to higher authorities.	▪ Third Party

6 Risk Level and Mitigation Instruments

The sub-projects assigned risk is moderate, Although, there are many activities have low risk only. The working in confined spaces and working near sewage are the only activity associated with moderate risk. thus, it requires the preparation of an Environmental and Social Management Plan ESMP as detailed in the Environmental and Social Management Framework ESMF for YEHCP AF. Some environmental and OHS impacts may be triggered. Therefore, UNOPS will include environmental and social requirements for contractor including all OHS requirements in the contract and tender documents

Negative E&S Impacts:

Based on the screening results, the sub-project may trigger moderate environmental and social impacts such as air and noise pollution, residual wastes, hazardous waste, community health and safety, and OHS issues which will be mitigated under WB ESF standards (ESS1" Assessment and Management of Environmental and Social Risks and Impacts", ESS2 " Labor and Working Conditions", ESS3 " Resource Efficiency and Pollution Prevention and Management", ESS4 " Community Health and Safety" , and ESS10 " Stakeholder Engagement and Information Disclosure").The intervention does not require land acquisition as it will be implemented on existing streets. Financial exploitation including bribes, fraud, or some other form of corruption is also an important risk that may happen during the intervention. Moreover, child labor could be hired for these activities as the need spread between societies. local community's health and safety involving GBV, discrimination, labor's behaviors toward local community cultures.

OHS measures have been put in place including conducting a risk assessment of all activities to measure the impacts on the safety of workers and communities. In such interventions, minor and moderate injuries may occur during the sub-project's activities even for the workers or the local communities. The main activities that workers may be harmed from are excavation works and falling into excavated zones, working in confined spaces during the works inside the manholes, installation pipes, lifting activities, falling loads on workers, manual handling of works materials, workers contacting hazardous materials (cement, etc.) and hazardous waste (sludge and sewage), working in bad weather conditions, and physical injuries caused by the use of such equipment in the workplace like a cement mixer, excavators … etc. Moreover, accidents while transporting materials or cars/vehicles running into workers while conducting the current work may occur, OHS risks from noise and air emissions (i.e during excavation and using machineries) bad odors from working near sewage, working near electricity poles and risks of electric shocks.

In terms of environmental impacts, it is expected to have minor pollution during the activities even from workers or from work activities, for instance, open defecation and solid waste produced by workers (trash and plastic bags) accumulates which pollutes the environment. Also, very limited localized, and short-term air pollution, loud noise, and gas emission may be generated by machines and vehicles. Soil contamination may occur because of excavation activities, and accidental oil spills. Risks of soil contamination may also occur from sewage and sludge mismanagement while dealing with existing cesspits and WWTP if it will be expanded. Moreover, vibration impact is anticipated due to compaction activities.

The sub-project will not lead to a block or change in rainwater runoff paths, no major water drainage areas will be diverted or blocked. Additionally, there are no groundwater wells or surface water paths in the targeted area. Thus, there will not be any anticipated impacts on the hydrology system in the targeted area. UNOPS will ensure the slope in the sanitation network will be as per the slope designs, and after backfilling of trenches the slope will be returned to the existing design of the slope of the street to avoid any change in the hydrology system.

The district where the sub-project is located does not encompass any archaeological site and there are no recognized cultural heritage areas. However, the contract will include provisions about chance find procedures and the training of staff/supervisors to deal with the emergence of any potential archaeological discoveries, including the need to contact the Antiquities Department in the Ministry of Tourism and the local council to assess the situation quickly.

During the site visits, it was noticed that the sub-project will be implemented in residential areas and inside the internal lanes where the children are present as well as pedestrians. Accordingly, impacts on community

health and safety are anticipated. UNOPS will ensure community health and safety and coordinate with the public, and local authorities before implementing any activities and raise public awareness regarding the potential risks and impacts as well as secure the excavations and activities locations from the children and pedestrians as mentioned in the mitigation measure table. The expected social risks are as follows:

- Lack of worker's awareness and knowledge on social safeguard issues on gender, SEA and GBV.
- Child Labor
- Community Health and Safety risks such as restriction of access and accidents Traffic risks and accidents.
- Temporary disruption of economic activities, including disruption of traffic and congestion
- Contaminated water due to mixing with sewage

UNOPS will ensure adding the mitigation measures listed in section 6 to the tender documents to ensure proper management of the environmental and social aspects as well as occupational health and safety. Moreover, the contractor code of conduct, a list of environmental and social requirements, and contractor liabilities have been prepared and added to the sub-project bidding documents to ensure full adherence to the environmental and social requirements. Specific training for the contractor has been designed and assigned before starting the implementation.

UNOPS will monitor the environmental and social issues during the implementation of the sub-project with the support of the community committee which will be involved in the monitoring, as well as following up on the complaints system to ensure that all complaints are received, reported, and resolved quickly.

6.1 Land Acquisition:

Land acquisition refers to all methods of obtaining land for project purposes, which may include outright purchase, expropriation of property, and acquisition of access rights, such as easements or rights of way. The land acquisition may also include:(a) acquisition of unoccupied or unutilized land whether or not the landholder relies upon such land for income or livelihood purposes; (b) repossession of public land that is used or occupied by individuals or households; and (c) project impacts that result in land being submerged or otherwise rendered unusable or inaccessible. "Land" includes anything growing on or permanently affixed to land, such as crops, buildings, and other improvements, and appurtenant water bodies.

The intervention does not require land acquisition as it will be implemented on existing public property[6] such as roads and vacant wasteland owned by the authorities. There are no squatters or other informal users along the alignments where the works will be implemented.

4-5 Resources and Services' access restrictions:

The subproject will be implemented on the existing streets and roads which will cause temporary restrictions on the services. Therefore, UNOPS will ensure the activities will be conducted section by section and each section. UWSSP and the contractor will coordinate with local communities and local authorities to ensure the subprojects will not limit access to the services and resources.

[6] There is not any land donation expected at the sub-project site, as per the current designs. Public property means no one owns it, and the local authorities only have the right to give permits to work on it, such as streets.

6.2 Labor Management:

The average duration of the worksites activities in all subprojects locations is approximately six months, which translates to 150 working days for 30 employees and the maximum working hours per day for each employee is 8 hrs as presented in Table 5

Table 5 :Expected labor in the sub-project

#	Labor	No.	Expected working days/employee	Total Expected working days
1	Project Manager	1	150	150
2	Supervisor	1	150	150
3	Civil Engineer	1	150	150
4	Plumper	5	125	625
5	Heavy Equipment Driver	3	90	270
6	ES Officer	1	150	150
7	Paramedic	1	150	150
8	Flag Man	2	90	180
9	ES Officer Assistant	1	150	150
10	HR Officer	1	150	150
11	Accountant	1	150	150
12	Procurement Officer	1	150	150
13	Plumper Assistant	5	125	625
14	Blacksmith	1	50	50
15	Blacksmith Assistant	1	50	50
16	Daily worker	4	125	500
Total		30	2005	3650

Although there is no need for lodging because the workers will be hired locally, they will use the restrooms that are present in the intervention areas.

The contractor shall:

- Ensure all workers are older than 18 Years old.
- Protect the workers from any risk that may be encountered during the implementation
- Maintain occupational health and safety system in the site to protect workers from hazards and risks and provide adequate health and safety training, required PPE, first aid box, and toilets with soap. Despite the fact that there are restrooms on the job sites, the contractor must ensure their usability and cleanliness.
- Provide the workers with potable drinking water, and shade during hottest hours
- Avoid all forms of forced, involuntary, unpaid or compulsory labor
- Provide life and medical insurance for all employees involved in onsite activities

6.3 Child Labor:

No child labor will be hired for these activities. The minimum age of work has been specified in the tender documents for contractors. Verification of legal documents is done before starting the work. The minimum accepted age is 18 years old and verification of age by checking IDs and other available documents will be

strictly applied. A labor log will be kept, and all workers will be registered. The contractor should use workers from the local communities as much as possible. Additionally, no forced labor will be used and the contractors will be obligated and monitored to implement the LMP.

6.4 Gender:

Both males, females, and people with disabilities were considered beneficiaries when designing the sub-projects. The sub-project will contribute to improving the living standards of people including women, men, and their children as well as IDPs. The interventions will generate positive impacts on livelihoods and the beneficiaries.

UNOPS is mainstreaming Gender in all aspects of the subproject's cycle as well as raising awareness amongst both male and female community members on job opportunities during subproject implementation.

6.5 Gender-Based Violence GBV, Sexual Exploitation and Abuse SEA and Sexual Harassment SH

The contractors and workers should sign the Code of Conduct and ensure workers respect and adhere to the Code of Conduct. CoC to respect the local community cultures, and adhere to the social safeguard issues on Gender, SEA/SH and GBV. Raise awareness on the GM system and how it can be used to report any GBV cases.

UNOPS, UW-PMU and Contractors should provide the workers with required training and daily toolbox talk in the OHS, GBV and SEA. Contractors should provide the work sites with GM system for all workers including providing complaints box and complaint means.

UNOPS has already taken the following steps in GBV/SEA/SH:

- In the stakeholder consultation meetings UNOPS has presented the project GBV SEA/SH action plan[7] and during the meetings, GBV issues were discussed with both men and women we paid more focused on female's participants due to their vulnerability and ensured to explain about the GM mechanism and highlighted how it is transparent, secure and confidential to use any of the GM access point.
- UNOPS has developed visibility materials to promote awareness for Protection from Sexual Exploitation and Abuse/Sexual Harassment PSEA/SH in local language (Arabic) the materials and messages used adapted to be suitable for Yemen context and sensitivity of the subject.
- GM focal point received specialized training about SEA/SH cases and the way to deal with it using survivor-centered approach.
- UNOPS developed standard operating procedures SOP and protocol for GM in how to deal with SEA/SH cases.
- UNOPS has conducted refresh sessions for Project Personnel in GBV/SEA/SH and trained

[7] https://docs.google.com/document/d/1s6WJthO-gzRnSnezqAsNOk1vgLQ0WrJJ/edit?usp=sharing&ouid=116970334290034221038&rtpof=true&sd=true

retainer's sites engineers as well.

- UNOPS has prepared risk assessment tools for GBV and will require contractors to fill a checklist on GBV/SEA/SH and to prepare code of conduct for their workers/staff.
- AS part of YEHCP AF GBV SEA/SH action plan UNOPS will roll out SEA/SH prevention and response plans for contractors , where the contractors need to prepare the action plan as part of the tender documents , UNOPS is supporting to enhance the contractors capacity in this area looking to the fact that almost they have zero knowledge and capacity , for that UNOPS developed contractors action plan template where it covers the most priority areas and UNOPS conducted induction session for contractors about this requirement and presented to contractors on how to prepare their own GBV SEA/SH prevention and response plans (GBV Action Plans) using the developed template , other in depth training sessions will follow and will continue during project life span.
- UNOPS will train contractors' PSEA/SH focal points.

6.6 Grievance Mechanism for Workers

The Workers must use the general GM system highlighted in section #10 to submit any grievances pertaining to them. These complaints may include, but are not limited to, the following:

- Termination/Summary Dismissal,
- Breach of Employment Contract Terms
- Work Injury
- Discrimination
- Sexual Harassment
- Remuneration
- Wrongful termination
- Suspension
- Waiver of Claims

GM shall adhere to the following principles:

- *Provision of information.* All workers should be informed about the grievance mechanism at the time they are hired, and details about how it operates should be easily available, for example, included in worker documentation or on notice boards.
- *Transparency of the process.* Workers must know to whom they can turn in the event of a grievance and the support and sources of advice that are available to them. All line and senior managers must be familiar with their organization's grievance procedure.
- *Keeping it up to date.* The process should be regularly reviewed and kept up to date, for example, by referencing any new statutory guidelines, changes in contracts or representation.
- *Confidentiality.* The process should ensure that a complaint is dealt with confidentiality. While procedures may specify that complaints should first be made to the workers' line manager, there should also be the option of raising a grievance first with an alternative manager, for example, a human resource (personnel) manager.
- *Non-retribution.* Procedures should guarantee that any worker raising a complaint will not be subject to any reprisal.
- *Reasonable timescales.* Procedures should allow for time to investigate grievances fully but should aim for swift resolutions. The longer a grievance is allowed to continue, the harder it can be for both sides to get back to normal afterwards. Time limits should be set for each stage of the process, for example, a maximum time between a grievance being raised and the setting up of a meeting to investigate it.
- *Right of appeal.* A worker should have the right to appeal to the World Bank or national courts if he or she is not happy with the initial finding.

- *Right to be accompanied.* In any meetings or hearings, the worker should have the right to be accompanied by a colleague, friend or union representative.
- *Keeping records.* Written records should be kept at all stages. The initial complaint should be in writing, if possible, along with the response, notes of any meetings and the findings and the reasons for the findings. Any records on SEA shall be registered separately and under the strictest confidentiality.
- *Relationship with collective agreements.* Grievance procedures should be consistent with any collective agreements.
- *Relationship with regulation.* Grievance processes should be compliant with the national employment code.

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7 Environmental and Social Risks Impact and Mitigation Measures

Mitigation measures have been determined to reduce the impact of potential environmental and social risks during the sub-project's implementation, which are provided in Table 6.

Table 6 : Potential Environmental and Social Risks Impact and Mitigation Measures

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
Occupational Health & Safety Impacts			
Lifting Operations Pipeline , manholes chamber rooms Impacts from Failure of lifting equipment; Falling loads; and workers being crushed by a moving Load or lifting equipment which all might result in fatalities or injuries.	• Provide required information and training on the lifting operations to the site workers. • Ensure applying safe lifting operations. • Ensure existence of a flag man and use of proper communication means. • Ensure testing and checking the lifting equipment and license of trained operator. • Ensure use of proper PPE safety materials and tools. • Prevent workers from standing close to the lifting area A safe distance between workers or pedestrians standing from the davit lifting device or any other lifting device has to be maintained. • Close the lifting area with fence to prevent access to the lifting area during lifting work. • Install warning signs for lifting activities • Carry out lifting work by well trained, qualified, and certified lifting team and with proper communication means and flagman. • Secure loads when lifting and use strong and reliable fixation materials to make sure that the load is well tighten • Use well-maintained equipment for lifting the Activates that are appropriate for the weight; • Protect the units against staining, discoloration and other damage until they are installed in their final location.	Contractor, UWSSP ESSO and UNOPS	

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	• Lifting device capacity shall be at least 1.65 times the maximum calculated static load at that point • An ultimate load shall be ≥4 times the maximum static load. • Ensure loads are securely attached and inspect the attachment before lifting		
Manual Handling Injuries that includes Fractures Damage to muscles, ligaments, and tendons Spinal disc injuries Trapped nerves Abrasions and cuts Burns Hernias	Provide required information and training on manual handling to the site workers. Ensure applying safe handling techniques. Remove space constraints, ensure good housekeeping and providing improved layouts Keep manual handling to one level, improve floor conditions and improve the environmental conditions. The floor must be clean from any obstacles and should be open, clean and well protected. Ensure use of appropriate PPE and safety materials. Addressing potential use of handling aids with matching safety measures. Ensure workers are aware of correct lifting techniques or physical work to avoid injuries including back injuries Ensure regular breaks are maintained and the presence of potable drinking water	Contractor, UWSSP ESSO and UNOPS	NA
Excavation Falling in excavated areas.	Protection from falls, Falling Loads, and Equipment Shoring, Shielding and support to all excavations greater than 1.8m deep if applicable the expected depth will be less than one meter. Confirm type of supports and level of	Contractor, UNOPS and UWSSP ESSO	NA

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	protection with the UWSSP and UNOPS Engineers. Provide supports to adjacent structures where necessary, sufficient to prevent damage arising from the rehabilitation work. Install safety excavation warning signs along trenches. Remove temporary supports progressively as backfilling proceeds. The contractor should support excavation sides by sheet piles with Jake/ shielding to avoid collapse of excavation or fall of materials into the excavations and ensure safe access and egress to excavation for equipment and workers. Remove unnecessary materials from the side of excavation to prevent materials full in excavation trenches. Provide occupational health and safety training to all employees involved in works. Install barricades around excavated zones or open zones Use hand / mechanical signals Grade soil away from the excavation Fence or barricade trenches left overnight Use a flagman, signals, and barricades Keep materials or equipment that might fall or roll into an excavation at least two (02) feet from the edge of excavations, or have retaining devices, or both. Provide warning systems such as mobile equipment, barricades, hand or mechanical signals, or stop logs, to alert operators of the		

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	edge of an excavation. If possible, keep the grade away from the excavation. Provide scaling to remove loose rock or soil or install protective barricades and other equivalent protection to protect employees against falling rock, soil, or materials. Prohibit employees from working on faces of sloped or benched excavations at levels above other employees unless employees at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment. Prohibit employees under loads that are handled by lifting or digging equipment. To avoid being struck by any spillage or falling materials, require employees to stand away from vehicles being loaded or unloaded. Operators remain in vehicle cabins during loading and unloading procedures A competent person must make daily inspections of excavations, areas around them and protective systems: • Before work starts and as needed, • After rainstorms, high winds or other occurrences which may increase hazards. • When reasonably anticipated that an employee will be exposed to any hazard.		
The emergency response and accidents	Contractor has to prepare emergency response plan and establish and maintain an emergency preparedness and response system, in collaboration with appropriate and	Contractor, UWSSP ESSO and UNOPS	

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	relevant third parties, including to cover: (i) the contingencies that could affect personnel of the sub-project to be financed; (ii) the need to protect the health and safety of sub-project workers; (iii) the need to protect the health and safety of the affected people and Affected communities. - The emergency preparedness and response system shall include (i) identification of the emergency scenarios, specific emergency response procedures, and training of emergency response teams, (ii) emergency contacts and communication systems/protocols (including communication with affected communities), (iii) procedures for interaction with government authorities (emergency, health, environmental authorities), (iv) permanently stationed emergency equipment and facilities (e.g., first aid stations, firefighting equipment, spill response equipment, personal protection equipment for the emergency response teams), (v) protocols for the use of the emergency equipment and facilities with clear identification of evacuation routes and muster points emergency drills and their periodicity based on assigned emergency levels or tiers, (vi) decontamination procedures and means to proceed with urgent remedial measures to contain, (vii) limit and reduce pollution within the physical boundaries of the project sites, property and assets to the extent possible. -The emergency preparedness will include both the construction and the operation phases, and		

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	a dedicated, trained, and competent contractor team will be trained to handle the emergency response responsibilities. First Aid and Accidents • Ensure that qualified first-aid by qualified personnel is always available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work. • Provide workers with rescue and first-aid duties with dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co- workers. Training would include the risks of becoming infected with blood–borne pathogens through contact with body fluids and tissue. • Provide eye-wash stations and/or emergency showers close to all workstations where immediate flushing with water is the recommended first-aid response. • Provide dedicated and appropriately equipped first-aid room(s) where the scale of work or the type of activity being carried out so requires. • Equip first aid stations and rooms with gloves, gowns, and masks for protection against direct contact with blood and other body fluids. • Make widely available written emergency procedures for dealing with cases of trauma or serious illness, including procedures for transferring patient care to an appropriate medical facility. • Immediately report all accidental occurrences with serious accident potential such as major		

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	equipment failures, contact with high-voltage lines from the electrical poles. Immediately investigate any serious or fatal injury or disease caused by the progress of work by the Contractor and submit a comprehensive report to UNOPS. Report any major incidents to the WB within 48 hours Details of the nearest hospital should be present on site.		
Risk of working activities involving entry into confined spaces, including manholes, sewers, pipelines,	Maintain insurance for workers in sub-project site according to the requirements and conditions of insurance in the bidding documents which should comply with labor law, UNOPS, and the World Bank regulations. Provide occupational health and safety training to all employees involved in works. Provide protective masks Half Face Mask Respirator with EN140 with P3 filters, oxygen breathing tank. , overalls, safety helmets, goggles, shoes, and overall safety materials as appropriate. Ensure selected PPEs are suitable to mitigate health and safety impacts related to sewer activities. Provide workers in high noise areas with earplugs or earmuffs. Ensure availability of first aid box. The contractors should submit daily report on the movement of workers, approved and	Contractor, UWSSP ESSO and UNOPS	

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	trained workers list, for workers working on the manholes or sewers. The contractors should protect workers and public by covering openings and establishing protected fencing, barricaded and guardrails around worksite locations, and overall use with appropriate awareness and/or warning signage where appropriate on the worksite. Following driving safety instructions i.e., trained drivers, following speed limits, using well maintained trucks. Maintain insurance for workers in the sub-project site according to the requirements and conditions of insurance in the bidding documents which should comply with labor law, UNOPS and the World Bank regulations. The contractors should ensure the safety of workers (appropriate collective protection equipment as well as PPEs) while working on the manholes and sewers and give all necessary vaccines to workers to prevent any diseases that may infect them. The contractors should provide suitable lighting inside the sewers and manholes during work hours. Contractors shall prepare and submit method of statement and OHS risk assessment for high-risk work activities including deep excavations, lifting operations and confined spaces work such as (manholes and inspection chambers). Provide self-contained breathing apparatus (oxygen cylinders) to all workers working in confined spaces and provide full body harness and lifelines for workers when working in		

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	confined spaces. Apply Permit to Work to ensure full compliance with OHS system and that all the measures are in place to ensure safety of public and workers. The contractors should conduct all works using trained workers using appropriate PPEs, including full face respiratory cartridge, disposable coverall/overall, and safety footwear with disposable boat cover for upper groundwork and for underground work (e.g., manholes and sewer lines). Other PPEs for Eye Protection (Safety Goggles), Hard Hat/Helmet, Gloves, Disposable Overalls and Boot Cover and all required PPEs, should be provided. The contractors should provide necessary PPEs, including self-contained breathing apparatus (SCBA) provided to workers inside manholes and sewers with proper training on how to use them properly. Workers should spend limited time in confined spaces. Ensure presence of extra oxygen tanks. Ensure workers are attached to safety ropes in case of dizziness in confined places. Conduct gas tests prior to working in confined areas and sewers and manholes Properly ventilate manholes before entering Ensure workers spend limited time in manholes Ensure workers are aware of workplace risks and safety measures Ensure all PPEs, oxygen tanks and overalls are well adhered to Inspect oxygen tanks before usage		

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	Ensure the presence of shower and washing facilities Ensure all workers in sewer and manholes and near wastewater and sludge obtained their vaccines including hepatitis and relevant vaccines.		
Risks from accidental electrical shocks from electrical poles	The safe clearance required beneath the overhead lines should be found by contacting the distribution network operator Vehicles, plant, machinery, equipment, or materials that could reach beyond the safe clearance distance should not be taken near the electrical line Operators should be instructed not carry out any work on top of the machinery near overhead electrical lines; The working should be under the direct supervision appointed to ensure that safety precautions are observed. The contractors should ensure the safety of workers (appropriate collective protection equipment as well as PPEs) while working near the electrical poles Provide occupational health and safety training to all workers involved in works The contractors should submit daily report on the movement of workers, approved and trained workers list, for workers working near the electrical poles Provide warning systems such as mobile equipment, barricades, hand or mechanical signals, or stop logs, to alert workers of the edge of an electrical pole. If possible, keep the grade away from the electrical poles.	Contractor, UWSSP ESSO and UNOPS	NA

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	Never touch an overhead line that has been brought down by machinery, or has fallen, until information and confirmation was received that the electrical line has been de-energized and made safe		
Risks from accidents	Provide occupational health and safety training to all employees involved in works. Provide protective masks, helmet, overall and safety shoes, and safety goggles, as appropriate. Provide workers in high noise areas with earplugs or ear mufflers. Ensure availability of first aid box. Details of the nearest hospital should be present on site. Following driving safety instructions i.e. trained drivers, following speed limits, using well maintained trucks. Ensure warning signs are added at a safe distance from workers and work place to ensure no worker is accidentally ran over by a vehicle Maintain insurance for workers in subproject site according to the requirements and conditions of insurance in the bidding documents which should comply with the national labor law. The contractor should submit daily reports on the movement of workers, approved and trained workers to perform the sewage network rehabilitation activity. The contractor should protect workers and public by covering openings and establishing	Contractor, UWSSP ESSO and UNOPS	

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	protected fencing, barricaded and guardrails around worksite locations. Contractor shall prepare and submit method of statement and OHS risk assessment for high-risk work activities including deep excavations. Ensure transport drivers are following good driving practices such as maintaining speed limit and wearing seat belts Perform drug test on drivers.		
Poor onsite sanitation or water supply	Providing employees with access to toilets and potable drinking water and soap. Provide and implement safety precautions onsite during the implementation of the sub-project. Ensure good housekeeping measures are kept	Contractor, UWSSP ESSO and UNOPS	$500
Vehicles running into workers	Use one-way path if possible with a proper warning signage system. Cars are only allowed to go towards one direction in the street. Avoid traffic routes passing close to any open edge. Ensure that there are safe areas for loading and unloading Make entrances and gateways wide enough. Set sensible speed limits and clearly signpost them. Where necessary, use suitable speed reduction measures, for example temporarily road speed bumps to restrict the speed on the road. Use a flagman, signals, barricades, and cones Stop the movement of vehicles in worksite in bad weather conditions to avoid collision during bad weather conditions workers should not be allowed to work.	Contractor, UWSSP ESSO and UNOPS	

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	Worksite entrance and exits, and not allow for unauthorized person or vehicles enter the worksite. Prohibit workers to climb on the vehicles during moving to avoid falling. Organizing awareness sessions on occupational health and safety before starting the work Flagman and signposts should be present at a safe distance from the project site to alert vehicle users on the work ahead in order not to crash into workers.		
Handling Chemicals	Ensure all chemicals (bituminous paint, cement) are handled and stored and disposed according to their material safety data sheet Ensure workers are wearing proper PPEs while handling chemicals such as gloves, masks and goggles. Ensure all materials are handled by trained workers Ensure all materials are stored, handled and disposed according to their MSDSs	Contractor, UWSSP ESSO and UNOPS	NA
Social Impacts			
Lack of workers awareness and knowledge on ESF requirements on gender, SEA/SH and GBV.	Contractor and workers must sign the code of conduct, and ensure workers respected and adhere to the code of conduct. Conduct regular awareness sessions on site in GBV prevention. GM system is in place to handle any issue on Gender SEA/SH and GBV. GM system for all workers including providing complaints box and complaint means. Link:	Contractor, UWSSP ESSO and UNOPS	

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct		
lack of access to houses	The activities will be conducted section by section, Alternative roads will be available for road users during implementation. Side route with a width of at least 1.2 meters will be provided to allow inhabitants to access their homes.	Contractor, UWSSP ESSO and UNOPS	NA
Contaminated water due to mixing with sewerage	Coordination with the LWSC to determine the paths of the water network pipes before beginning implementation, as well as assigning a LWSC representative to be present at the work site during implementation. Coordinating the supply of water to residents with the LWSC In the event that water is mixed with sewage, sterilize (with chlorination) the water network and citizens' tanks in collaboration with the LWSC, and test to ensure that the water network is sterilized before supplying citizens with water.		AN
Access of public and children into working site.	Install barriers, danger warning signs and restriction signs to only authorized persons and signs showing the potential danger to the public. And establish barriers around the working site, equipment area and excavation area. Do not allow public and children to access working sites in all cases Avoid construction work during facility time. Ensure proper storage of construction material and fencing the storage area to prevent accessibility.		NA

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
Child Labor	All workers should be more than 18 years old. Verifying age of workers by checking IDs and official documents should be mandatory. Ensure a worker log is available, and all workers are registered.	Contractor, UWSSP ESSO and UNOPS	NA
Traffic risks and accidents	Conduct as much work as possible during low traffic periods Emphasis safety aspects among drivers inform drivers on local speed limit, and monitor implementation Apply regular maintenance of vehicles Coordinate with local authorities to provide and manage alternative road for smooth traffic if required Control and manage traffic, by using traffic cones, barriers, fences, or lights as appropriate Coordinate with local responsible authorities to improve signing and visibility Train workers on good driving practices such as maintaining speed limit and adhering to seat belt and traffic regulations Avoid movement of transport trucks during peak hours Ensure a flagman and signs are present at safe distance to alert road users of the work ahead to ensure no accidents Add speed limit at safe distance from project area	• Contractor to implement • Traffic department to advice	N.A
Environmental Impacts			
Noise impacts from machineries	Noise should be minimum (Max 84 dB(A) during lifting operation and installation, and proper mitigation measure and PPE should apply.	Contractor, UWSSP ESSO and UNOPS	NA

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	Ensure work is carried out during daytime Use well maintained equipment		
Solid waste produced by work	Ensure that work wastes are properly stored at designated areas in bags and containers and regularly collected and transported by an approved contractor to an authorized disposal site Ensure proper housekeeping practices are maintained Storing and covering excavated piles at less windy areas	Contractor, UWSSP ESSO and UNOPS	NA
Hazardous Substances and wastes	Ensure all chemicals including oil are stored and handled and disposed according to their MSDSs (i.e., oil, sludge, used PPEs, etc.) and at insulated zones from the ground to avoid contamination. Ensure hazardous materials are labelled Ensure oil is stored at an inaccessible ventilated area, away from heat and unattainable by animals and pedestrians Ensure all workers handling hazardous materials and wastes are properly trained and wearing suitable PPEs. Store oil at inaccessible areas away from heat and with proper ventilation. Ensure presence of fire extinguisher and train workers on how to use them. Train workers to handle and store hazardous materials and wastes as per their material safety data sheets (MSDSs). Provide proper PPEs for workers handling hazardous materials and wastes	Contractor, UWSSP ESSO and UNOPS	NA

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
Air pollution due to emissions from lifting equipment/ transportation equipment. Dust generation during excavation	Visual observation and applying equipment checklist for inspection to ensure low emission and well-maintained equipment will be the only ones used. Ensure using dust sweeping methods to reduce water used in dust suppression Use water in dust suppression in limited amount, preferably. Preferably grey water. Use of well-maintained equipment and properly maintain machinery to minimize exhaust emissions of CO, suspended particulates and fumes. Spray water for dust control. Covering trucks which transport construction and waste materials. Storing and covering excavated piles at less windy areas	Contractor, UWSSP ESSO and UNOPS	NA
Soil, surface and ground water	Ensure no wastes or excavated materials are stored inappropriately to prevent contamination of ground water and water sources. Provide secondary containment for all chemical contained vessel or rumps. Proper storage of hazardous substances and away from soil and water resources. Store chemicals, hazardous waste such as sewage and sludge according to their Material Safety Data Sheets (MSDSs). Establish mobile latrines or constructed latrines at insulated areas from the ground and away from runoff areas , disposed to cesspit then empty by using suction trucks and transfer to *Mahweet* WWTP or It is discharged to the nearest manhole to the public network and fill	Contractor, UWSSP ESSO and UNOPS	NA

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
	the cesspit with gravelly soil, watering and compaction .And good housekeeping measures are kept Ensure the presence of spill prevention kit and train workers on how to use them Ensure solid waste is regularly collected and stored at designated sites in plastic containers Properly collect, transport and dispose of solid waste at designated permitted sites or landfill allocated by the local authorities and cleaning funds; Properly covering trucks which transport collected waste to avoid spillage during transportation. Attach and submit the waste receipt from the assigned landfill authorities.		
Operation and Maintenance			
Operation and Maintenance (Staff Health and Safety)	Same mitigation measures for installation will apply for relevant risks during inspection and maintenance as well. Scheduled cleaning and inspection of the sewer stations; more frequent cleaning in those areas with a history of stoppages due to sediment, roots, debris, and fats, oils, and grease to minimize the potential for SSOs (Sanitary Sewer Overflows). Inform locals on maintenance periods Maintenance activity records should be available to support appropriate analysis and reporting Inform locals with maintenance periods. Contractor to provide OHS and environment and social training on maintenance of the network.	Contractor (for training only during handover), UWSSP ESSO and UNOPS	NA

Potential Impact	Mitigation Measure	Implementation Responsibility	Estimated cost (USD)
Estimated Total cost			

8 Environmental and Social Monitoring Plan

The implementation of the mitigation measures will be monitored accordingly through daily, weekly and event-based by the Contractor, LWSCs and UNOPS.

The aspects that will be monitored, which is provided in Table 7, will be updated to accommodate any emergency or updated aspects that may be recommended by the monitoring reports.

Table 7 : Monitoring Plan

Impacts	Measurements (incl. methods & equipment)	Frequency	Implementation responsibility
	Community Health and Safety		
Public safety during the construction work.	Method: - Visual observation and photographic documentation of safety measures. - Visual observation for installing warning signs, barricading of working areas with safety tapes and fencing/barricades to prevent unauthorized access of public and pedestrians to the working areas. Indicators - Number of recorded injuries and types of injuries and accidents Number of grievances received regarding the community health and safety.	Daily basis during rehabilitation work and weekly during site inspection visits, On any complaint	Contractor, UWSSP and UNOPS
The risk of employing children and forced labor for work activities.	Method: - Site inspection, checking and documentation of contractor employee records Indicators: o Number of recorded employees below the age of 18	Weekly during site inspection and regularly by TPM	Contractor, UWSSP and UNOPS and TPM
Complaints Handling	Method: Complaints register will be kept on site and this will feed into the GM. Details of complaints received will be incorporated into the audits as part of the monitoring process Indicators: • Number of Reported and registered Grievances • Number of complaints resolved.	Weekly	Contractor, UWSSP and UNOPS

GBV and SEA issues	Indicators - Number of reported and registered cases of the SEA/SH through project GM. - Number of reported cases of contractors' noncompliance to SEA/SH obligation on work sites.	Weekly	Contractor, UWSSP and UNOPS and TPM
General Environmental Impacts			
Dust generation during work implementation.	Method: Visual observation and photographic documentation of equipment induced dust clouds during maintenance/ rehabilitation activities Indicator: visible dust emissions/visible dust cloud Number of received complaints regarding dust and air emissions	Daily Weekly for received complaints	Contractor, UWSSP and UNOPS
Increased level of noise	Method: Site supervision/inspection and documentation to ensure compliance with the noise mitigation measures Indicator Number of received complaints regarding noise emissions	Weekly during site inspection.	Contractor, UWSSP and UNOPS
Production, proper disposal and disposal of work's debris, waste materials and Chemicals.	Method: Inspection and photographic documentation Indicators: Records of presence of waste stored in open areas or near drainage areas and increase in waste pollution Number of complaints received regarding waste mismanagement Presence of waste receipt Chemicals are labelled and stored according to their MSDSs	Daily for complaints on waste disposal and storage and management during rehabilitation works and site inspection	Contractor, UWSSP and UNOPS
Soil contamination	Method: Inspection and photographic documentation and water testing Indicators:	Daily for soil contamination	Contractor, UWSSP and UNOPS

	Change in soil color and presence of visible fuel leaks Presence of sewage and sludge leaks on the soil		
Occupational Health and Safety			
Lifting Operations	Visual inspection to ensure that all lifting activities in the work site are executed safely and as per the standard lifting safety rules. Visual inspection that safety distance from lifting sites is adhered to Indicators: Number of injured workers from lifting activities Number of near misses from falling objects	Daily	Contractor, UWSSP and UNOPS
Working in confined areas and near sewers	Visual inspection, gas tests Indicators: Number of injured workers as a result of working in confined spaces Gas tests performed shows safe emissions level Presence of overalls, safety lines, oxygen tanks etc.	Daily	Contractor, UWSSP and UNOPS
Manual Handling	Visual inspection to ensure that all manual handling activities are performed according to the OHS manual handling safety rules and instructions. Record any noncompliance Ensure that the implementation of the safety techniques to control the manual handling risk is monitored continuously. Indicators: Number of injured workers and number of workers not wearing proper PPEs.	Daily	Contractor, UWSSP and UNOPS
Hazardous materials, chemicals and wastes	Visual inspection Indicators: Hazardous materials and chemicals storage is unlabeled	Daily	Contractor, UWSSP and UNOPS

	Presence of hazardous material at undesignated zones Empty chemical bins are stored inappropriately Number of workers not wearing proper PPEs and number of injured workers from chemicals such as skin blister from cement		
Excavation	Visual inspection to ensure that all excavation activities are executed safely and all safety rules are implemented. Record any noncompliance. Indicators: Number of workers wearing masks Number of workers falling into excavated areas	Daily	Contractor, UWSSP and UNOPS
Work related accidents and injuries.	Method: - Inspection and photographic documentation - Maintaining a record of injuries and accidents in project reports specifying cause and location - Contractors are required to provide a list of trained workers, who will be checked for their training skills and age and the measures will be implemented onsite and followed by regular monitoring visits. - Inspection and photographic documentation Indicator: The record of injuries and accidents in project reports specifying cause and location.	Daily	Contractor, UWSSP and UNOPS and TPM
Poor onsite housekeeping, toilet and water supply, leading to illness and disease.	Method: Site inspection - Indicator: o Presence of clean water and soap o Presence of pests o Reports on illness and diseases • Presence of waste outside designated bins	Daily during site inspection and regularly by TPM	Contractor, UWSSP, UNOPS and TPM

Safety	Indicator: Hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases, first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth.	Continuous daily	Contractor, UWSSP and UNOPS
Environmental incidents and near misses	Method: : Environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned. Indicator: Number and types of recorded environmental misses	Continuous daily	Contractor, UWSSP and UNOPS
Major works:	Indicator: Work undertaken and completed, progress against project schedule, and key work fronts (work areas).	Continuous daily	Contractor, UWSSP and UNOPS
E&S and OHS requirements:	Indicator: Register non-compliance incidents with permits and national law (legal noncompliance), project commitments, or other E&S requirements.	Continuous daily	Contractor, UWSSP and UNOPS
E&S/OHS inspections and audits:	Indicator: By contractor, engineer, or others, including authorities to include date, inspector or auditor name, sites visited, and records reviewed, major findings, and actions taken.	Continuous daily	Contractor, UWSSP and UNOPS
Workers:	Indicator Number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age with evidence that no child labor is involved, and skill level (unskilled, skilled, supervisory, professional, management).	Continuous daily	Contractor, UWSSP and UNOPS

Training on E&S issues	Method: Including dates, number of trainees, and topics. Indicator: Training records and number of training sessions on OHS risks and Environmental & Social issues and attendances	Weekly	Contractor, UWSSP and UNOPS
Footprint management:	Details of any work outside boundaries (Such transportation of equipment and materials) or major off-site impacts caused by ongoing work—to include date, location, impact, and actions taken.	Monthly	Contractor, UWSSP and UNOPS
Worker grievances:	Indicator: Number or grievances, details including occurrence date, grievance type, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.	Weekly	Contractor, UWSSP and UNOPS and TPM
Major changes to contractor's environmental and social practices.	Indicator: Records of Major changes to contractor's environmental and social practices.	Weekly	Contractor, UWSSP and UNOPS and TPM

Deficiency and performance management	Indicator: Actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until UNOPS determines the issue is resolved satisfactorily	Weekly	Contractor, UWSSP and UNOPS and TPM
Operation and Maintenance (Staff Health and Safety and community health and safety)	Ensure same monitoring measures are implemented during operation and maintenance for relevant risks	Continuous daily	Local Authority/WSLC
Operation and Maintenance	Number and type and details for training on how to maintain the rehabilitated network. Indicator: Number of recorded grievances related to network issues and resolved issues Number of recorded leaks Number of misfunctions Number of times clogging was recorded Number of maintenance sessions conducted	Training Prior to handing the project to the community (contractor and UNOPS). Maintenance shall be periodical/Continuous (local authority/WSLC)	Contractor, Local Authority/WSLC UWWSP and UNOPS
All costs will be the responsibility of each party including the contractor and will be included in the contract BoQ.			

9 Public Consultation

Public consultation process takes the form of direct interviews with local communities and other stakeholders in the selected Sub-project area i.e Mahweet city. The consultations were conducted in the subproject areas with 17 persons.

The consultations with the stakeholders took place in WSSLC Mahweet city and the participants included representatives of the Local Authority and beneficiary communities some of whom were housewives. There were both old and young as well as, educated ones and illiterates. , The interviews were conducted from 5-7 of October 2022 by UWSSP social specialist with 17 persons: 12 males, and 5 females. .

Consultation was conducted with stakeholders, including, key informants to voice their concerns and opinions on the sub-project benefit, impact and reflection of their priorities.

The local residents were complaining about wastewater regular flooding onto the streets and around their houses too. Bad odor produced from the wastewater and formation of suitable environment for disease vector breeding. They emphasized on the urgent need of rehabilitation of the existing sewerage system and look forward to have the proposed intervention to be implemented quickly and improve the environment situation and protect them from pollution and disease caused by wastewater accumulation in the streets.

The intervention implementation will also contribute in (WSSLC DG) eliminating the likely source of the epidemic's disease distribution in the city regions.

The stakeholders also informed, that their feedback would be heard through proper mechanism (GRM), through which their concern could be raised to the proper management and responded in timely manner.

Topics of the consultations are:

- Inform beneficiaries about the activities to be undertaken, the intervention objectives and the sub-projects timetable;
- Ensure participation of sub-projects beneficiaries both females and males with awareness on their rights to give feedback including GM contacts, anonymous complaints and escalation of grievances if not satisfied with the resolution and action taken;
- Discuss the positive impacts that the sub-projects will have and the sub-projects potential negative impacts and proposed mitigation measures to avoid possible impacts.
- Raise the awareness on the GBV issues
- The Sub-projects activities were discussed with the consulted people.
- The sub-project's negative environmental and social impacts and the planned mitigation measures were discussed with the consulted people in detail.
- The work in these sites will increase the employment and business opportunities for the locals

Consultation Findings and Feedback

The various concerns raised related with their responses are given in table 8:

Table 8: Public consultations concerns raised and their Responses

#	Concerns Raised	Responses
Minimize the effects of noise, dust, vibration, traffic associated with excavation and other work activities on the nearby communities living along the subprojects' areas.		If the contractor encounters a solid, challenging rock, he may use a variety of machineries to speed up the process, but he will keep them in good working order, properly tuned, and maintained to reduce exhaust emissions and vibration issues. He will ensure to reduce the traffic impact on society by implementing proper implementation measures such as one way path and proper signage system The Contractor will also ensure that the suggestions made in this ESMP are implemented.
The Contractor shall dispose solid waste on regular basis.		It was briefed that the Contractor will be bound to safely dispose all the solid waste generated in demarcated waste disposal sites.
The blockage of the road		The work will be carried out section by section to reduce the road blockage to the minimum

Consultation during implementation

Consultations will continue during implementation with the previously consulted representative local communities to assess beneficiaries' satisfaction on implementation of mitigation measures and accommodation of all their concerns and will conduct broader consultation with more beneficiaries and wider representatives of local communities' citizens.

To ensure citizen engagement during subproject implementation, the following mechanism will be adapted:

- Continue consultation with local communities by interviews and using questionnaires to assess beneficiaries' satisfaction on the implementation of activities and safeguards.
- Hold interviews during implementation of subproject in the targeted areas with both male and female citizens/ beneficiaries conducted by male and female moderators/facilitators in separate sessions;
- Utilize GIS-based portal mapping for all activities including sub projects supported to promote transparency to reach more citizens.
- Include a TPM component in reaching citizens and beneficiaries during implementation;
- Receive feedback from citizens through the UWS-PMU and UNOPS established GRM during implementation of subproject.

10 Grievance Mechanism GM

UNOPS GM will be used in the sub-project.

The grievance redress mechanism will focus on the following during the implementation Process:

- Record grievances, both written and oral, categorizing and prioritizing them, andproviding solutions within an agreed timeframe;
- Discuss the grievances on a regular basis with relevant authorities and identifydecisions/actions for issues that can be resolved at that level;
- Informing the project management of any more serious issues;
- Reporting to the aggrieved parties about the developments regarding their grievances and the decisions;
- All information about grievance procedures, grievance forms, and responses will be available in languages readily understandable to the locals.

The following Table 9 shows the expected grievances in these subprojects

Table 9: Type of expected grievances

Categories of Grievances
1. Basic information
– Access to subproject information
– Correction and deletion of untrue or misleading information that affects the person
2. Ethics and conduct
– Government entities and staff
– Implementing Partner staff
4. Violation and breach of codes of ethics
– Violation of codes of ethics;
– Breach of the code of ethics by government officers:
– Breach of Code of Conduct and Ethics by staff of Implementing Partners
5. Violation of human rights and fundamental freedoms
– Gender equality and general equality matters.
– Equality and freedom from discrimination (Equality -every person; Equality of men and women to opportunities in political, economic, cultural and social)
– Non-discrimination of special needs groups
6. Corruption and Economic crimes
– Unethical conduct
7. Labor and working conditions
– Termination/Summary Dismissal,
– Breach of Employment Contract Terms
– Work Injury
– Discrimination
– Sexual Harassment
– Remuneration
– Wrongful termination

– Suspension
– Waiver of Claims
8. Environmental compliance violations
– Violation of environmental standards laid out in the ESMPs, and ESMF , including complaints about noise, dust, pollution, waste accumulation, debris, damages to the eco system etc.
9. Occupational Health and Safety (OHS)
– Violation of occupational health and safety measures and standards laid out in the ESMF, ESMPs – Issues of Community Health and Safety
11. Gender-Based Violence (GBV) / Sexual Exploitation and Abuse (SEA) / Sexual Harassment (SH)
– Gender based violence committed by project personnel or any worker on the Project, or GBV committed in relation to the Project
– Sexual Exploitation and Abuse committed by Project staff or any worker of an IP associated to these subproject
– Sexual Harassment committed by subproject staff or any worker associated to these subproject

10.1.1 Available Channels

- **A phone number for a hotline operator:** The phone number of a grievance hotline operator must be widely distributed among subproject stakeholders. The Hotline Operator is available every day from 8 a.m. to 5.00 p.m. via a toll-free number. Anyone with a concern can call the hotline number and file a complaint with the Project. Operators will respond in either Arabic or English.
- **A phone call and/or a WhatsApp message:** The GM officer will accept complaints 24 hours a day, seven days a week via the WhatsApp number provided to all stakeholders.
- **A Complaint box** must be installed on the sub-project sites. Complaint boxes provide a more anonymous way of filing a grievance or for providing feedback. Grievances or feedback submitted to the Complaint Box must be expressed in writing. Boxes are clearly marked as Complaint box and grievance mechanism.

10.1.2 Tracking, Investigating and Resolving Complaints

The GM log maintained by UNOPS will track the date the complaint was received, date responded to, the type of response, and if the complaint was resolved to the satisfaction of the plaintiff.

The ESSO will coordinate with local partners, local field staff and local government officials to ensure prompt follow up action in response to each complaint. More specifically, the GM focal point wills forename complaints:

Inform the plaintiff if the complaint is accepted or rejected within 3 days from receiving the complaint; any technical input from project engineers; if necessary, the response will require input from project engineers.

If the complaint is accepted, send the plaintiff an officially stamped review card indicating:

- plaintiff name or legal representative
- plaintiff address
- complaint title
- review date
- list of annexes submitted with the complaint

Work with engineers, local partners, and contractors to resolve the complaint within 28 days of its submission.

10.1.3 Steps to handle GM

- Publicizing: stakeholder's consultation, printed materials;
- Receiving and registering complaints: staff at local and central level who will be responsible for receiving registering and tracking complaints;
- Acknowledging: The GM staff (team) acknowledges receipt of the complaint within 2-3 working days. Inform the complainant on the eligibility of his/her complaint;
- Anonymous complaints: To be studied as well;
- Reviewing and investigating, collect, review and analyze related documents;
- Conducting interviews of the involved persons, officers and staff;
- Analyzing the related national legislations & regulations, World Bank Policies & Guidelines and UNOPS standards;
- Summarizing the facts and findings;
- Developing resolution options: based on the collected evidence, the GM staff (team) will draw conclusions, make recommendations for solutions, and present it to the complainant;
- If the solution is not accepted, complaint will be presented to the Program Manager as a second level to appeal who can make the resolution and/or can delegate an arbitrary to investigate on the complaint and propose recommendations for resolution;
- Implementing resolution: If the solution is accepted, then will be implemented;
- Monitoring and closing: the complaint should be monitored for a reasonable period of time to make sure that the complainant does not express additional concerns, and then the complaint could be closed.

Reporting (recording): prepare concise summary reports of the complaints received, with the resolutions taken and status of resolutions implementation, and filled in the database with detailed records.

11 Reporting of ESMP

The ESSO will report on monthly basis the implementation of the ESMP and UNOPS will report the ESMP implementation to the WB. There will be also irregular reports based on the situation and updates. The Supervision Consultant (UWSSP Employee) will monitor and report weekly and irregularly on the level of mitigation measures implementation and environmental issues to UNOPS. The contractor shall monitor, keep records and report on the following environmental and social issues: safety, Environmental incidents and near misses, major works, ESHS requirements, ESHS inspections and audits: workers, training on ESHS issues, footprint management, external stakeholder engagement, details of any security risks, worker grievances, external stakeholder grievances, major changes to Contractor environmental and social practices, deficiency and performance management.

The following table (10) provides indicative reporting plan.

Table 10 :Reporting Plan

What	How	Who	When
Compliance level to the ESMP including environmental and social issues, OHS, GM, etc.	Based on monitoring and inspections, log, the consultant reports, GM log	ESSO (UWSSP &UNOPS)	Weekly and monthly from ESSO and quarterly from UNOPS to WB.
Compliance level to the ESMP and environmental and social issues: safety, environmental incidents and near misses, major works, ESHS requirements, ESHS inspections and audits: workers, training on ESHS issues, footprint management, external stakeholder engagement, details of any security risks, worker grievances, external stakeholder grievances, major changes to Contractor environmental and social practices, deficiency and performance management.	Consultant based on monitoring, inspection, records, logs, contractor reports.	Supervision Consultant (appointed by the implementing partner).	Weekly
Environmental and social issues: safety, environmental incidents and near misses, major works, ESHS requirements, ESHS inspections and audits: workers, training on ESHS issues, footprint management, external stakeholder engagement, details of any security risks, worker grievances, external stakeholder grievances, major changes to Contractor environmental and social practices, deficiency and performance management.	Contractor ESSO based on monitoring, inspection, records, logs.	Contractor	Weekly

Annex: 1 Environmental and Social Requirements for Contractors

Contractors shall meet the following Environmental, Health, Safety and Social (including labor) requirements –thereafter called ESHS requirements1.

The ESHS requirements include 9 sections

1. Contractor Environmental and Social Management Plan (C-ESMP)
2. ESHS Training
3. Construction Site Management
4. Occupational Health and Safety (OHS)
5. Chance Find Procedures
6. Emergency Preparedness and Response
7. Stakeholder Engagement
8. Code of Conduct
9. Contractor Environmental and Social Reporting

Contractor Environmental and Social Management Plan (C-ESMP)

- Prepare and submit to UWS-PMU / UNOPS for approval a Contractor Environmental and Social Management Plan (C-ESMP).
- Include in the C-ESMP a detailed explanation of how the contractor's performance will meet the ESHS requirements
- Ensure that sufficient funds are budgeted to meet the ESHS requirements, and that sufficient capacity is in place to oversee, monitor and report on C-ESMP performance.
- Put in place controls and procedures to manage their ESHS performance.
- Get prior written approval from UWS-PMU Engineers before starting construction or rehabilitation activities.

ESHS Training

- Determine ESHS training needs in collaboration with UWS-PMU/ UNOPS
- Maintain records of all ESHS training, orientation, and induction.
- Ensure, through appropriate contract specifications and monitoring that service providers, as well as contracted and subcontracted labor, are trained adequately before assignments begin.
- Demonstrate that its employees are competent to carry out their activities and duties safely. For this purpose, the Contractor shall issue a Competence Certificate for every person working on site (relative to trade and aspect of work assignment) that specifies which tasks can be undertaken by which key personnel.
- Training should include occupational health and safety measures, GBV HS and social health and safety measures, Environmental health and safety measures, waste management and hazardous materials management.

Orientation Training

- Provide ESHS orientation training to all employees, including management, supervisors, and workers, as well as to subcontractors, so that they are apprised of the basic site rules of work at/on the site and of personal protection and preventing injury to fellow employees.
- Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

Visitor Orientation

- Establish an orientation program for visitors, including vendors that could access areas where hazardous conditions or substances may be present.
- Visitors shall not enter hazard areas unescorted.
- Ensure that visitors shall always be accompanied by an authorized member of the contractor, or a representative of UNOPS or UWS-PMU, who has successfully fulfilled the ESHS orientation training, and who is familiar with the project site construction hazards, layout, and restricted working areas.

New Task Employee and Contractor Training

- Ensure that all workers and subcontractors, prior to commencement of new assignments, have received adequate training and information enabling them to understand work hazards and to protect their health from hazardous ambient factors that may be present. The training should adequately cover the step-by-step process that is needed for Project activities to be undertaken safely, with minimum harm to the environment, including:

  - Knowledge of materials, equipment, and tools
  - Known hazards in the operations and how they are controlled
  - Potential risks to health
  - Precautions to prevent exposure
  - Hygiene requirements
  - Wearing and use of protective equipment and clothing
  - Appropriate response to operation extremes, incidents and accidents

Construction Site Management

Vegetation

- Prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the construction site
- Protect all trees and vegetation from damage by construction operations and equipment, except where clearing is required for permanent works, approved construction roads, or excavation operations
- Revegetate damaged areas on completion of the Works, and for areas that cannot be revegetated, scarifying the work area to a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion
- Use, as much as possible, local species for replanting and species that are not listed as a noxious weed
- Repair, replant, reseed or otherwise correct, as directed by UNOPS or UWS-PMU, and at the Contractor's own expense, all unnecessary destruction, scarring, damage, or defacing of the landscape resulting from the Contractors operations
- Transport labor and equipment in a manner to avoid as much as possible damage to grazing land, crops, and property

Protection of the Existing Installations

- Safeguard all existing buildings, structures, works, pipes, cables, sewers, or other services or installations from harm, disturbance or deterioration during construction activities
- Coordinate with local authorities to identify existing infrastructure that might not be visible

- Repair any damage caused by the Contractor's activities, in coordination with concerned authorities.
- Take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of properties to the construction activities, and more generally to the public
- Maintain safe access to public and private properties that might be affected by construction activities. If necessary, provide acceptable alternative means of passage or access to the satisfaction of the persons affected.
- Avoid working during night hours

Waste from Construction Activities

- Collect and properly store and manage all solid wastes and hazardous wastes resulting from the construction activities, including construction debris and spoils, to prevent the contamination of soil and groundwater. In case chemicals are present they should be stored and disposed according to their Material Safety Data Sheets (MSDSs)
- Remove unneeded excavation material from construction sites as soon as possible
- Agree with relevant municipalities about construction waste disposal
- Carefully select waste disposal sites, to be approved by UNOPS or UWS-PMU.
- Minimize littering of roads by ensuring that vehicles are licensed and loaded in such a manner as to prevent falling off or spilling of construction materials, and by sheeting the sides and tops of all vehicles carrying mud, sand, other materials or debris
- Transfer construction waste to assigned places in the selected waste disposal sites with documented confirmation.
- Properly dispose of solid waste and debris and hazardous waste at designated permitted sites waste disposal sites allocated by the local authorities and obtain a receipt of waste from the authorized landfill authority.

Hazardous and Toxic Materials

Toxic and deleterious wastes resulting from the Project Company's activities require special attention in order to forestall their introduction into the natural environment which could result in harm to people, aquatic life or natural growth of the area. The Contractor shall take precautions relative to the conditions specified herein.

- Train workers regarding the handling of hazardous materials
- Store hazardous materials as per the statutory provisions of the Manufactures, Storage and Import of Hazardous Chemicals Rules (1989), under the Environment (Protection) Act, 1986.
- Provide adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids,
- Use impervious surfaces for refueling areas and other fluid transfer areas
- Train workers on the correct transfer and handling of fuels and chemicals and the response to spills
- Provide portable spill containment and cleanup equipment on site and training in the equipment deployment
- Deposit or discharge toxic liquids, chemicals, fuels, lubricants and bitumen into containers for salvage or subsequent removal to off-site locations.

- Treat hazardous waste separately from other waste
- Avoid the storage or handling of toxic liquid adjacent to or draining into drainage facility.
- Keep absorbent materials or compounds on Site in sufficient quantities corresponding to the extent of possible spills

Area Signage

- Appropriately mark hazardous areas.
- Install warning signs
- Ensure that signage is in accordance with international standards and is well known to, and easily understood by workers, visitors and the general public as appropriate.
- Demarcate work sites with safety tape, fencing or barricades, as appropriate, to prevent unauthorized access to the construction sites
- Safeguard public safety by covering holes and by installing guardrails along temporary pathways.

Decommissioning of Worksites and Plant

- Clear construction sites of any equipment or waste, and ensuring that the sites are free from contamination.
- Dispose of or recycle any equipment or waste in an appropriate and environmentally sound manner.
- Hand construction sites over to the original owners, taking into account his/her wishes and national legislation.

Health and Safety

Severe Weather and Facility Shutdown

- Design and build work place structures to withstand the expected elements for the region and designate an area designated for safe refuge, if appropriate.
- Develop Standard Operating Procedures (SOPs) for project or process shut-down, including an evacuation plan.

Lavatories and Showers

- Provide adequate lavatory facility (toilets and washing areas) for the number of people expected to work at the construction sites, and make allowances for segregated facility, or for indicating whether the toilet facility is “In Use” or “Vacant”.
- Provide toilet facility with adequate supplies of hot and cold running water, soap, and hand drying devices.
- Where workers may be exposed to substances poisonous by ingestion and skin contamination may occur, provide facility for showering and changing into and out of street and work clothes.

Potable Water Supply

- Provide adequate supplies of potable drinking water from a fountain with an upward jet or with a sanitary means of collecting the water for the purposes of drinking
- Ensure that water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) meets drinking water quality standards

Clean Eating Area

- Where there is potential for exposure to substances poisonous by ingestion, make suitable arrangements to provide clean eating areas where workers are not exposed to the hazardous or noxious substances

Personal Protective Equipment (PPE)

- Identify and provide at no cost appropriate PPE to workers, the workers of subcontractors, as well as to visitors, which gives adequate protection without incurring unnecessary inconvenience to the individual
- Ensure that the use of PPE is compulsory.
- Provide sufficient training in the use, storage and maintenance of PPE to its workers and workers of its subcontractors.
- Properly maintain PPE, including cleaning when dirty and replacement when damaged or worn out;
- Determine requirements for standard and/or task-specific PPE based on of Job specific Safety Analysis (JSA);
- Consider the use of PPE as a last resort when it comes to hazard control and prevention, and always refer to the hierarchy of hazard controls when planning a safety process.

Noise

Institute appropriate measures to reduce the exposure of workers to construction noise, including but not limited to:

- Avoid exposure to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day withouthearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- Enforce the use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110 dB(A).
- Provide hearing protective devices capable of reducing sound levels at the ear to at most 85 dB(A).
- Reduce the “allowed” exposure period or duration by 50 percent for every 3 dB(A) increase in in excess of 85 dB(A).
- Perform periodic medical hearing checks on workers exposed to high noise levels.
- Rotate staff to limit individual exposure to high levels.
- Install practical acoustical attenuation on construction equipment, such as mufflers.
- Use silenced air compressors and power generators
- Keep all machinery in good condition
- Install exhaust silencing equipment on bulldozers, compactors, crane, dump trucks, excavators, graders, loaders, scrapers and shovels.
- Post signs in all area where the sound pressure level exceeds 85 dB(A).
- Shut down equipment when not directly in use
- Provide advance notice to occupants if an activity involving high level impact noise is in close proximity to buildings.

First Aid and Accidents

- Ensure that qualified first-aid by qualified personnel is always available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work.
- Provide workers with rescue and first-aid duties with dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co- workers. Training would include the risks of becoming infected with blood–borne pathogens through contact with bodily fluids and tissue.
- Provide eye-wash stations and/or emergency showers close to all workstations where immediate flushing with water is the recommended first-aid response.

- Provide dedicated and appropriately equipped first-aid room(s) where the scale of work or the type of activity being carried out so requires.
- Equip first aid stations and rooms with gloves, gowns, and masks for protection against direct contact with blood and other body fluids.
- Make widely available written emergency procedures for dealing with cases of trauma or serious illness, including procedures for transferring patient care to an appropriate medical facility.
- Immediately report all accidental occurrences with serious accident potential such as major equipment failures, contact with high-voltage lines, and exposure to hazardous materials, slides, or cave-ins to UNOPS and UWS-PMU.
- Immediately investigate any serious or fatal injury or disease caused by the progress of work by the Contractor, and submit a comprehensive report to UNOPS and UWS-PMU.

Communicable Diseases

Sexually-transmitted diseases (STDs), such as HIV/AIDS, are the communicable diseases of most concern because oflabor mobility. Recognizing that no single measure is likely to be effective in the long term, the Contractor shall implement a combination of behavioral and environmental modifications to mitigate communicable diseases:

- Conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all construction site staff (including all the Contractor's employees, all subcontractors of any tier, consultants' employees working on the site, and truck drivers and crew making deliveries to the site for Works and Services executed under the Contract, concerning the risks, dangers and impact, and appropriate avoidance behavior of communicable diseases.
- Ensure ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers.
- Promote collaboration with local authorities to enhance access of workers families and the community to public health services and ensure the immunization of workers against common and locally prevalent diseases.
- Provide basic education on the conditions that allow the spread of other diseases such Lassa Fever, Cholera and Ebola and other respiratory borne illnesses. The training should cover sanitary hygiene education.
- Prevent illness in immediate local communities by:
    - Conducting immunization programs for workers in local communities to improve health and guard against infection.
    - Providing health services.

COVID-19

In the context of the COVID-19 pandemic, Contractors shall develop and implement measures to prevent or minimize an outbreak of COVID-19, and develop procedures indicating what should be done if a worker gets sick. The measures shall include:

- Assessing the characteristics of the workforce, including those with underlying health issues or who may be otherwise at risk
- Confirming that workers are fit for work, including temperature testing and refusing entry to sick workers
- Considering ways to minimize entry/exit to site or the workplace, and limiting contact between workers and the community/general public
- Training workers on hygiene and other preventative measures, and implementing a communication strategy for regular updates on COVID-19 related issues and the status of affected workers

- Treating workers who are or should be self-isolating and/or are displaying symptoms
- Assessing risks to continuity of supplies of medicine, water, fuel, food and PPE, taking into account international, national and local supply chains
- Reducing, storing and disposing of medical waste
- Adjusting work practices, to reduce the number of workers and increase social distancing
- Expanding health facility on-site compared to usual levels, developing relationships with local health care facility and organize for the treatment of sick workers
- Building worker accommodations further apart, or having one worker accommodation in a more isolated area, which may be easily converted to quarantine and treatment facility, if needed
- Establishing a procedure to follow if a worker becomes sick (following WHO guidelines)
- Implementing a communication strategy with the community, community leaders and local government in relation to COVID-19 issues on the site.

Emergencies

- Establish and maintain an emergency preparedness and response system, in collaboration with appropriate andrelevant third parties including to cover: (i) the contingencies that could affect personnel and facility of the project to be financed; (ii) the need to protect the health and safety of project workers; (iii) the need to protect the health and safety of the Affected Communities. The emergency preparedness and response system shall include:
- Identification of the emergency scenarios
- Specific emergency response procedures
- Training of emergency response teams
- Emergency contacts and communication systems/protocols (including communication with Affected Communities when necessary)
- Procedures for interaction with government authorities (emergency, health, environmental authorities)
- Permanently stationed emergency equipment and facility (e.g., first aid stations, firefighting equipment, spill response equipment, personal protection equipment for the emergency response teams)
- Protocols for the use of the emergency equipment and facility
- Clear identification of evacuation routes and muster points
- Emergency drills and their periodicity based on assigned emergency levels or tiers
- Decontamination procedures and means to proceed with urgent remedial measures to contain, limit and reduce pollution within the physical boundaries of the project property and assets to the extentpossible.

Stakeholder Engagement

The Project Company will be required to undertake a process of stakeholder engagement with representative persons and communities directly affected by the activities it undertakes, including, if necessary, the public disclosure of its C- ESMP. The Project Company shall also maintain throughout the Project good relations with local communities and will give these communities prior notice of plans and schedules as they might affect local people.

The stakeholder engagement process will also be applicable in the event of land acquisition associated with changes in the footprint of activities.

Labour Force Management

Labour Influx

- Avoid contamination of fresh water sources
- Provide opportunities for workers to regularly return to their families
- Provide opportunities for workers to take advantage of entertainment opportunities away from rural host communities
- Ensure that children and minors are not employed directly or indirectly on the project, and keep registration and proof of age for all employees on-site.
- Pay adequate salaries for workers to reduce incentive for theft
- Pay salaries into workers' bank accounts rather than in cash
- Get an appropriate mix of locally and non- locally procured goods to allow local project benefits while reducing risk of crowding out of and price hikes for local consumers
- Establish substance abuse prevention and management programs
- Hire workers through recruitment offices, and avoid hiring "at the gate" to discourage spontaneous influx of job seekers
- Identify authorized water supply source and prohibiting use from other community sources;
- Put in place measures to reduce water and electricity consumption;
- Employ locals to the extent possible;
- Develop and adopt a Gender Action Plan to promote the transfer of construction skills to local women, to facilitate their employment at the Project site, including training and recruitment targets.

Labor Conditions

- Implement the measures and commitments defined in the Labor Management Procedures. A copy of the LMP can be found in the Project ESMF
- Provide all workers with terms and conditions that comply with Yemeni Labor Legislation, most particularly Decree 5/1995) and applicable International Labour Organization conventions on workplace conditions.

Insurance

- Provide insurance for call employees involved in onsite activities, as indicated by Yemen's Labor Law
- Compensate any employee for death or injury, except to the extent that liability arises.

Grievance Mechanism for Workers

The Contractor will put in place a Grievance Mechanism for its workers and the workers of its subcontractors that is proportionate to its workforce. The GM shall be distinct from the Project level Grievance Mechanism for affected individuals and communities, and shall adhere to the following principles:

- Provision of information. All workers should be informed about the grievance mechanism at the time they are hired, and details about how it operates should be easily available, for example, included in worker documentation or on notice boards.
- Transparency of the process. Workers must know to whom they can turn in the event of a grievance and the support and sources of advice that are available to them. All line and senior managers must be familiar with their organization's grievance procedure.
- Keeping it up to date. The process should be regularly reviewed and kept up to date, for example, by referencing any new statutory guidelines, changes in contracts or

representation.

- Confidentiality. The process should ensure that a complaint is dealt with confidentially. While procedures may specify that complaints should first be made to the workers' line manager, there should also be the option of raising a grievance first with an alternative manager, for example, a human resource (personnel) manager.
- Non-retribution. Procedures should guarantee that any worker raising a complaint will not be subject to any reprisal.
- Reasonable timescales. Procedures should allow for time to investigate grievances fully but should aim for swift resolutions. The longer a grievance is allowed to continue, the harder it can be for both sides to get back to normal afterwards. Time limits should be set for each stage of the process, for example, a maximum time between a grievance being raised and the setting up of a meeting to investigate it.
- Right of appeal. A worker should have the right to appeal to the World Bank or national courts if he or she is not happy with the initial finding.
- Right to be accompanied. In any meetings or hearings, the worker should have the right to be accompanied by a colleague, friend or union representative.
- Keeping records. Written records should be kept at all stages. The initial complaint should be in writing, if possible, along with the response, notes of any meetings and the findings and the reasons for the findings. Any records on SEA shall be registered separately and under the strictest confidentiality.
- Relationship with collective agreements. Grievance procedures should be consistent with any collective agreements.
- Relationship with regulation. Grievance processes should be compliant with the national employment code

Protection from Sexual Exploitation and Abuse

- Provide repeated training and awareness raising to the workforce about refraining from unacceptable conduct toward local community members, specifically women
- Inform workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted.
- Prohibit its employees from exchanging any money, goods, services, or other things of value, for sexual favors or activities, or from engaging any sexual activities that are exploitive or degrading to any person.
- Develop a system to capture gender-based violence, sexual exploitation and workplace sexual harassment related complaints/issues.
- Adopt a policy to cooperate with law enforcement agencies in investigating complaints about gender-basedviolence.

Protection from Child Labor

- Verify that workers are older than 18 when hiring
- Exclude all persons under the age of 18.
- Review and retain copies of verifiable documentation concerning the age of workers

Code of Conduct

- Contractors shall ensure that all employees, including those of subcontractors, are informed about and sign Code of Conduct:

Contractor Environmental and Social Reporting

Contractors shall monitor, keep records and report on the following environmental and social issues:

- *Safety:* hours worked, lost time injury (LTI), lost workdays, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).

- *Environmental incidents and near misses:* environmental incidents and high potential near misses and howthey have been addressed, what is outstanding, and lessons learned.
- *Major works:* those undertaken and completed, progress against project schedule, and key work fronts (work areas).
- *ESHS requirements:* noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other ESHS requirements.
- *ESHS inspections and audits:* by Project Company, Independent Engineer, UNOPS and its implementingpartners, or others—to include date, inspector or auditor name, sites visited and records reviewed, major findings, and actions taken.
- *Workers:* list of workers at each site, confirmation of ESHS training, indication of origin (expatriate, local, nonlocal nationals), gender, age with evidence that no child labor is involved, and skill level (unskilled, skilled, supervisory, professional, management).
- *Training on ESHS issues:* including dates, number of trainees, and topics.
- *Footprint management:* details of any work outside boundaries or major off-site impacts caused by ongoingconstruction—to include date, location, impacts, and actions taken.
- *External stakeholder engagement:* highlights, including formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming fromvarious stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
- *Details of any security risks:* details of risks the Project Company may be exposed to while performing itswork—the threats may come from third parties external to the project.
- *Worker grievances:* details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
- *External stakeholder grievances:* grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be gender-disaggregated.
- *Major changes to Contractors environmental and social practices*.
- *Deficiency and performance management:* actions taken in response to previous notices of deficiency or observations regarding ESHS performance and/or plans for actions to be taken should continue to be reported to UNOPS until it determines the issue is resolved satisfactorily.

Annex 2: GM Complaint and Suggestion Form

مشروع رأس المال البشري الطارئ في اليمن نموذج لألية التظلمات والشكاوى	استمارة توثيق ومتابعة شكاوى المستفيدين من مشروع رأس المال البشري الطارئ في اليمن	Yemen Emergency Human Capital Project YEHCP Sample of GM Complaint and Suggestion Form

"Documenting and Monitoring Complaints Form of

Beneficiaries of Yemen Emergency Human Capital Project YEHCP "

الاسم الثلاثي للمستفيد: **Beneficiary Name**			
رقم البطاقة الشخصية: **ID No.**		رقم الهاتف للمتابعة Tel Number for follow up	
العنوان الدائم: **Permanent Address**			
اسم النشاط المنفذ (مركز/وحدة) **Name of Activity under implementation**			
مكان تنفيذ النشاط: **Place of activity under implementation**	القرية: **Village**	المديرية: **District**	المحافظة: **Governorate**

نوع الشكوى **Complaint Type**	إدارية **Administrative**	فنية **Technical**	مالية **Financial**	أخرى **Other**

موضوع الشكوى:
Complaint Subject

الوضع الحالي: **Current Situation**			
أسباب المشكلة: Reason of the problem			
التاريخ: Date		توقيع صاحب الشكوى: Complainant Signature	

- الجهة التي يجب أن يقدم لها الشكوى: UNOPS – Tool Free No 8000190 Tel: 01 504914/915 - SMS: 739888388
.....Email: GM.yemen@unops.org
The entity, which the complaint should be forwarded to:

-الرأي في جدية الشكوى:.....
Opinion on the seriousness of the complaint

-الجهة المحول لها الشكوى :.....
The complaint transferred to

- المدة الزمنية اللازمة للبت في الشكوى:.....
Time required for response

-مدى رضى المستفيد عن الاستجابة لحل شكواه:.....
Satisfaction of beneficiary in responding to his/her complaint

الإجراءات المتخذة :Action taken			
ما ترتب عليها من نتائج: The results of the action taken		التاريخ:Date	

اسم مستلم الشكوى ووظيفته: .....
Name of person received the complaint and his/her position

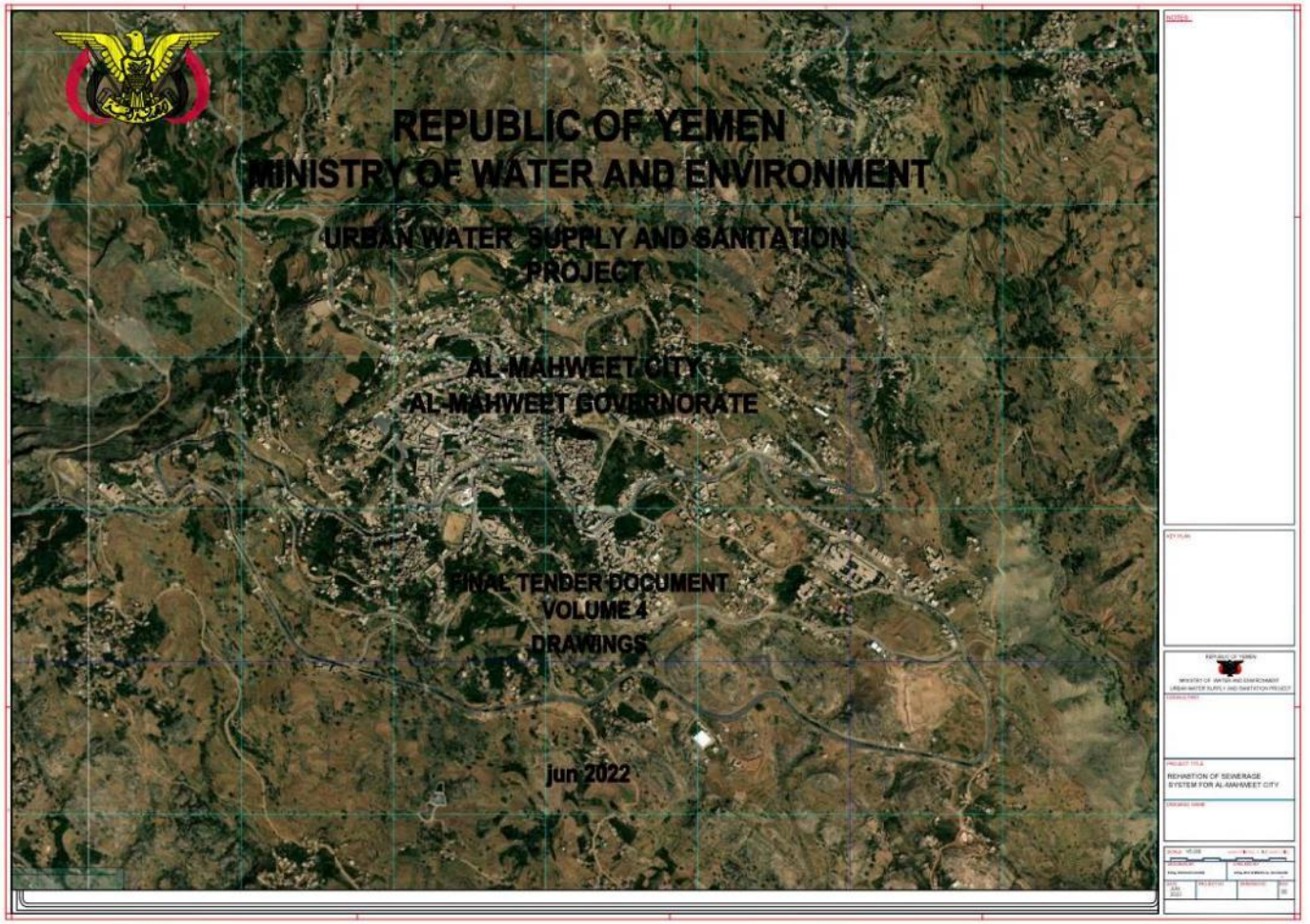
توقيع الموظف المختص/ Signature..... التاريخ/ Date : .....


THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP
UNOPS
المشروع الطارئ
للخدمات الحضرية المتكاملة في اليمن
مكتب الأمم المتحدة لخدمات المشاريع يرحب باستقبال كافة الشكاوى
والاستفسارات والمقترحات المتعلقة بأنشطة مشاريعنا
من الأحد إلى الخميس
من الساعة 8 صباحاً وحتى الساعة 4 عصراً
عبر معلومات الإتصال المذكورة أدناه
SUNDAY-
THURSDAY
الرقم المجاني
8000190
00967 - 739 888 388
00967 - 01 - 505 914 / 5
grm-yemen@unops.org

Annex 4: Table List of consulted Persons (available upon request)

Annex 5: Sample of Consultation Questionnaire (available upon request)

Annex 6: Maps


REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
URBAN WATER SUPPLY AND SANITATION PROJECT
AL-MAHWEET CITY
AL-MAHWEET GOVERNORATE
FINAL TENDER DOCUMENT
VOLUME 4
DRAWINGS
jun 2022
REHABILITATION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY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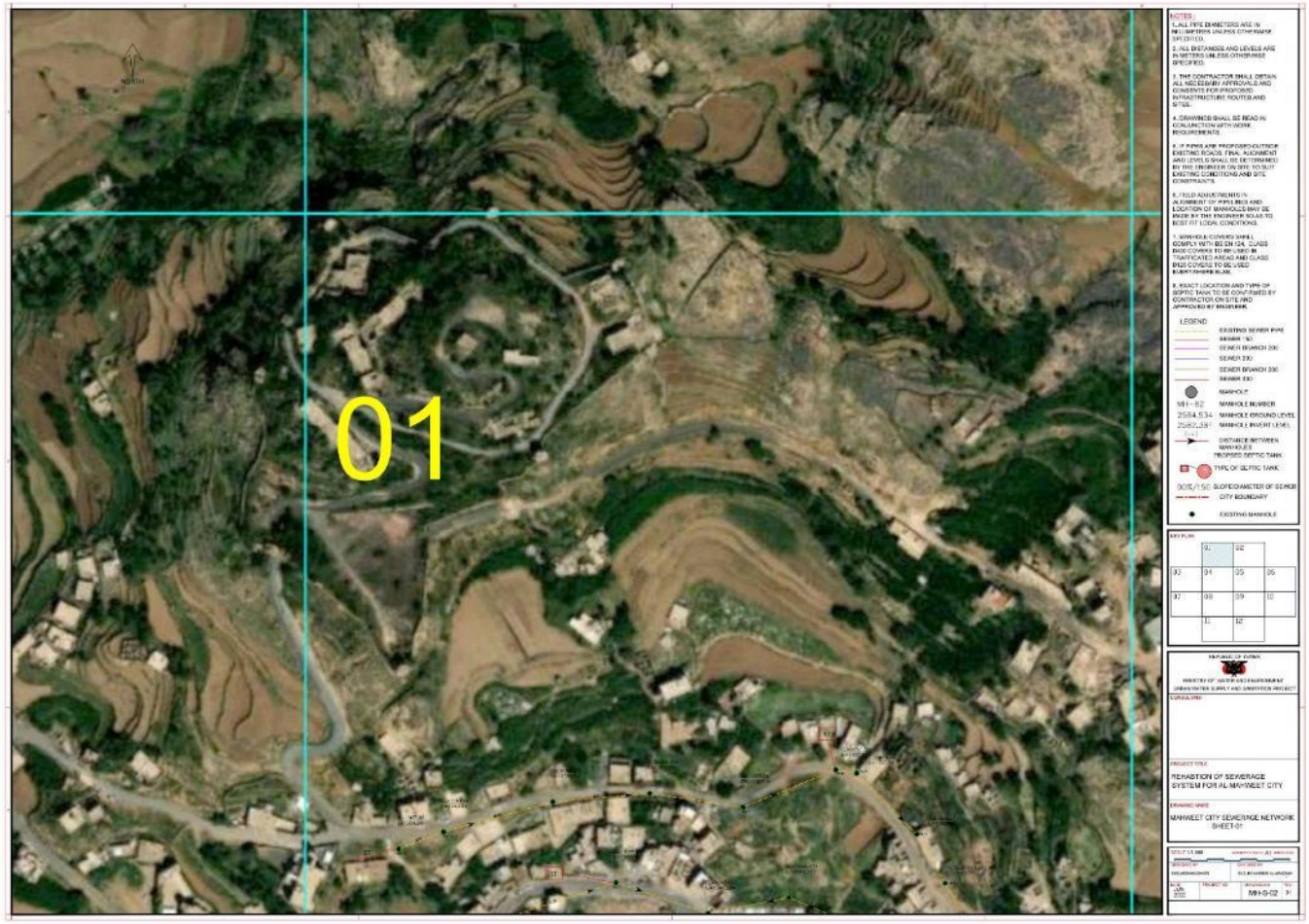
LEGEND:
KEY PLAN
REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
URBAN WATER SUPPLY AND SANITATION PROJECT
CONSULTANT
PROJECT TITLE
REHABITION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
DRAWING NAME
MAHWEET CITY SEWERAGE NETWORK GENERAL LAYOUT
MH-S-02


01
NOTES :
1. ALL PIPE DIAMETERS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. ALL DISTANCES AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS AND CONSENTS FOR PROPOSED INFRASTRUCTURE ROUTES AND SITES.
4. DRAWINGS SHALL BE READ IN CONJUNCTION WITH WORK REQUIREMENTS.
5. IF PIPES ARE PROPOSED OUTSIDE EXISTING ROADS, FINAL ALIGNMENT AND LEVELS SHALL BE DETERMINED BY THE ENGINEER ON SITE TO SUIT EXISTING CONDITIONS AND SITE CONSTRAINTS.
6. FIELD ADJUSTMENTS IN ALIGNMENT OF PIPELINES AND LOCATION OF MANHOLES MAY BE MADE BY THE ENGINEER SO AS TO BEST FIT LOCAL CONDITIONS.
7. MANHOLE COVERS SHALL COMPLY WITH BS EN 124. CLASS B125 COVERS TO BE USED IN TRAFFICKED AREAS AND CLASS D400 COVERS TO BE USED ELSEWHERE.
8. EXACT LOCATION AND TYPE OF SEPTIC TANK TO BE CONFIRMED BY CONTRACTOR ON SITE AND APPROVED BY ENGINEER.
LEGEND
EXISTING SEWER PIPE
SEWER 150
SEWER BRANCH 200
SEWER 200
SEWER BRANCH 300
SEWER 300
MANHOLE
MH-82 MANHOLE NUMBER
2584.534 MANHOLE GROUND LEVEL
2582.281 MANHOLE INVERT LEVEL
DISTANCE BETWEEN MANHOLES
PROPOSED SEPTIC TANK
TYPE OF SEPTIC TANK
90/R/150 SLOPE/DIAMETER OF SEWER
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
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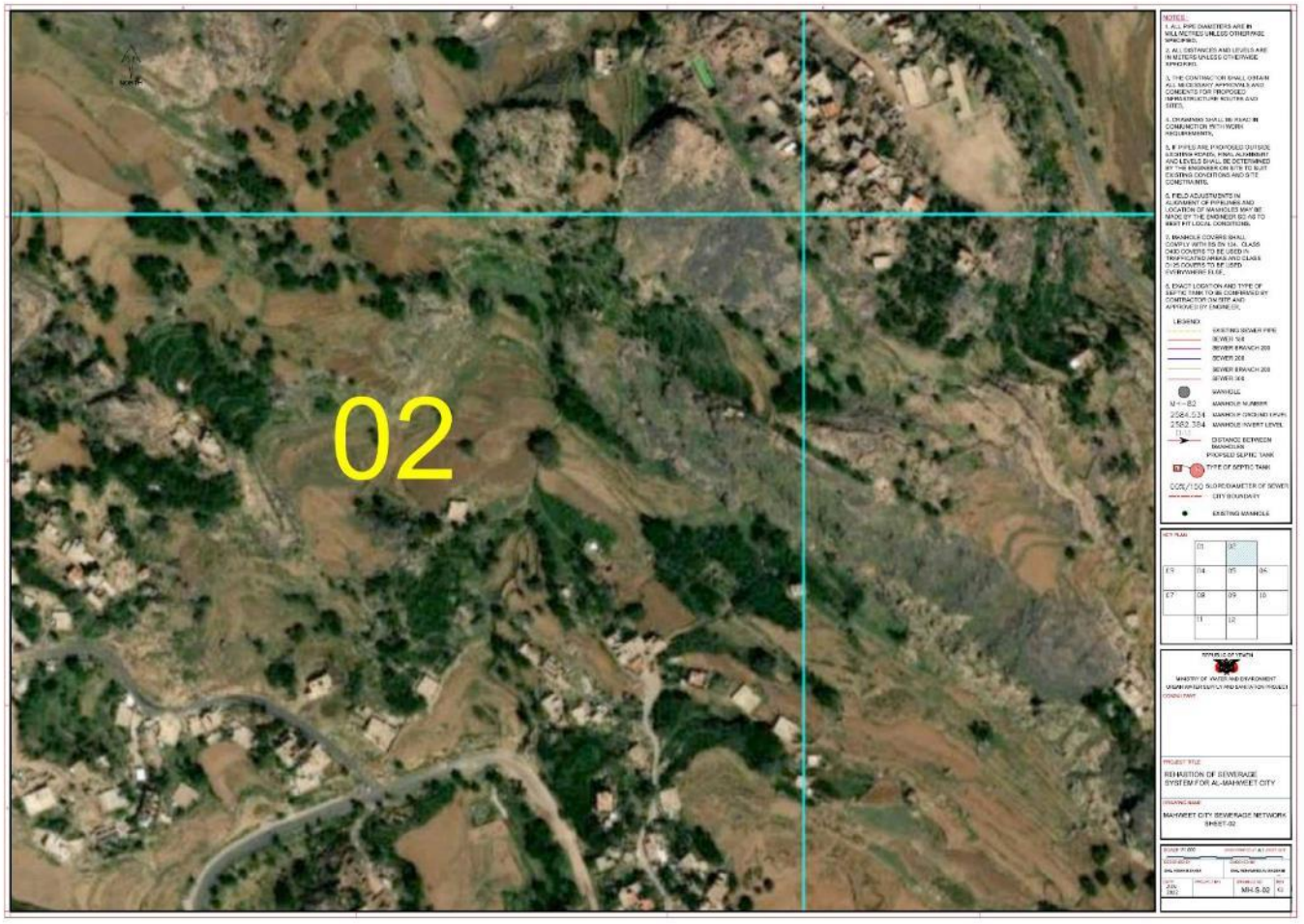
REHABITION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
MAHWEET CITY SEWERAGE NETWORK SHEET-01
MH-S-02


02
NOTES :
1. ALL PIPE DIAMETERS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL DISTANCES AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS AND CONSENTS FOR PROPOSED INFRASTRUCTURE ROUTES AND SITES.
4. DRAWINGS SHALL BE READ IN CONJUNCTION WITH WORK REQUIREMENTS.
5. IF PIPES ARE PROPOSED OUTSIDE EXISTING ROADS, FINAL ALIGNMENT AND LEVELS SHALL BE DETERMINED BY THE ENGINEER ON SITE TO SUIT EXISTING CONDITIONS AND SITE CONSTRAINTS.
6. FIELD ADJUSTMENTS IN ALIGNMENT OF PIPELINES AND LOCATION OF MANHOLES MAY BE MADE BY THE ENGINEER SO AS TO MEET PIT LOCAL CONDITIONS.
7. MANHOLE COVERS SHALL COMPLY WITH BS EN 124. CLASS D400 COVERS TO BE USED IN TRAFFICKED AREAS AND CLASS C250 COVERS TO BE USED EVERYWHERE ELSE.
8. EXACT LOCATION AND TYPE OF SEPTIC TANK TO BE CONFIRMED BY CONTRACTOR ON SITE AND APPROVED BY ENGINEER.
LEGEND
EXISTING SEWER PIPE
SEWER 1/8
SEWER BRANCH 200
SEWER 200
SEWER BRANCH 200
SEWER 3/8
MANHOLE
MANHOLE NUMBER
MANHOLE GROUND LEVEL
MANHOLE INVERT LEVEL
DISTANCE BETWEEN MANHOLES
PROPOSED SEPTIC TANK
TYPE OF SEPTIC TANK
SIZE/DIAMETER OF SEWER
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
01
02
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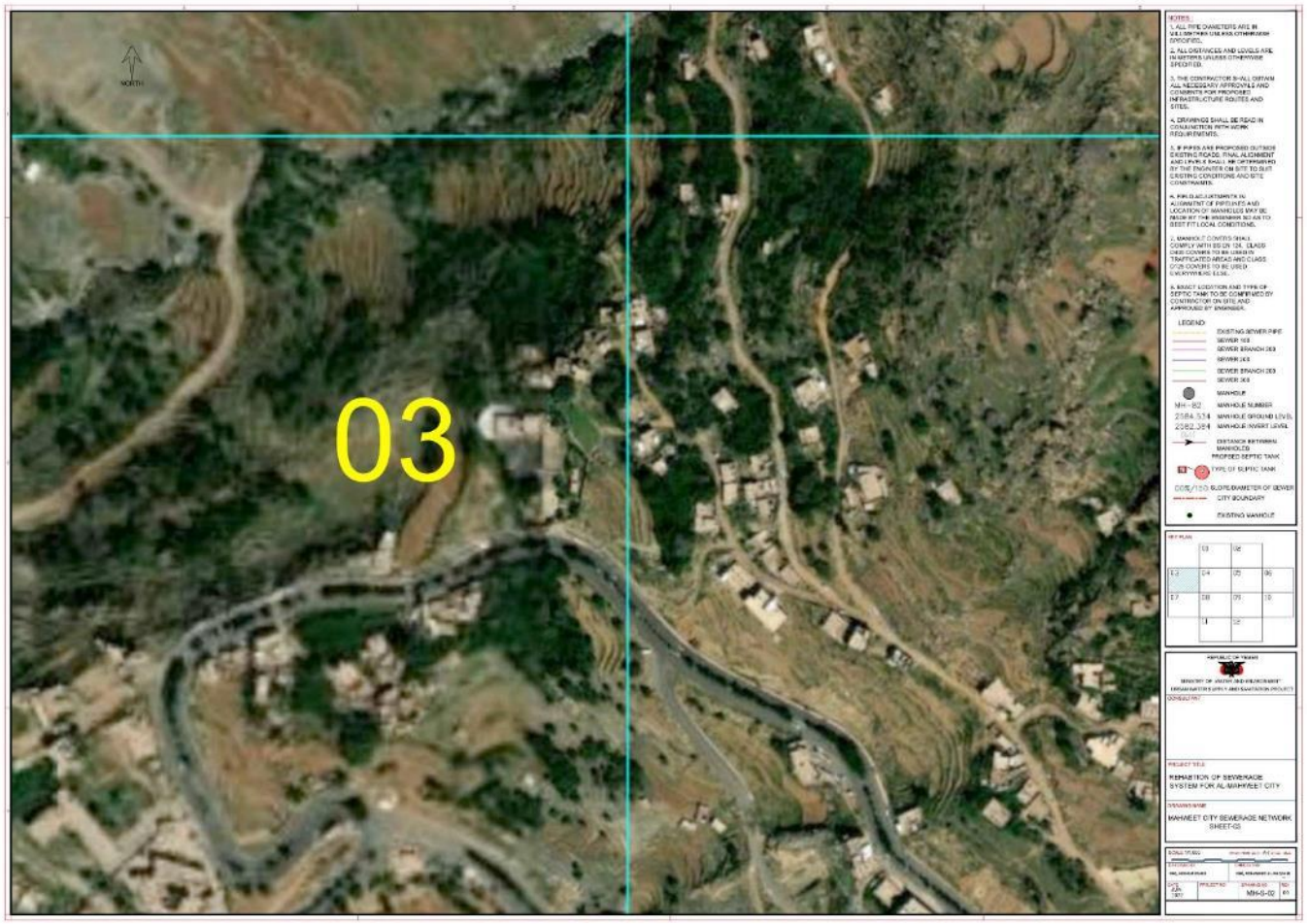
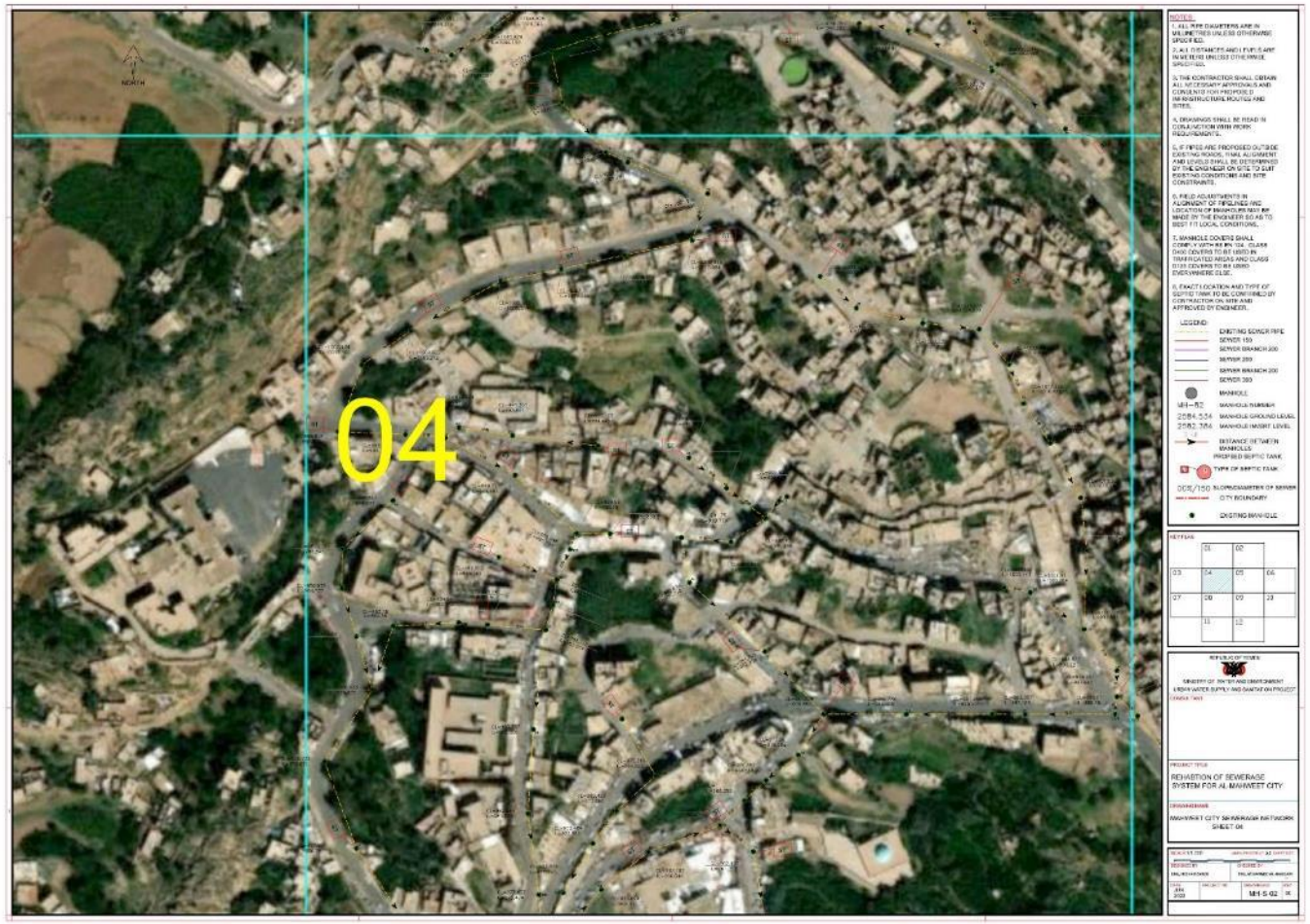
REPUBLIC OF SOUTH
MINISTRY OF WATER AND ENVIRONMENT
PROJECT TITLE
REHABILITATION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
DRAWING NAME
MAHWEET CITY SEWERAGE NETWORK SHEET-02
MH-S-02


03
NOTES
LEGEND
MANHOLE
MANHOLE NUMBER
MANHOLE GROUND LEVEL
MANHOLE INVERT LEVEL
CITY BOUNDARY
EXISTING MANHOLE
REHABITION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
MAHWEET CITY SEWERAGE NETWORK SHEET-03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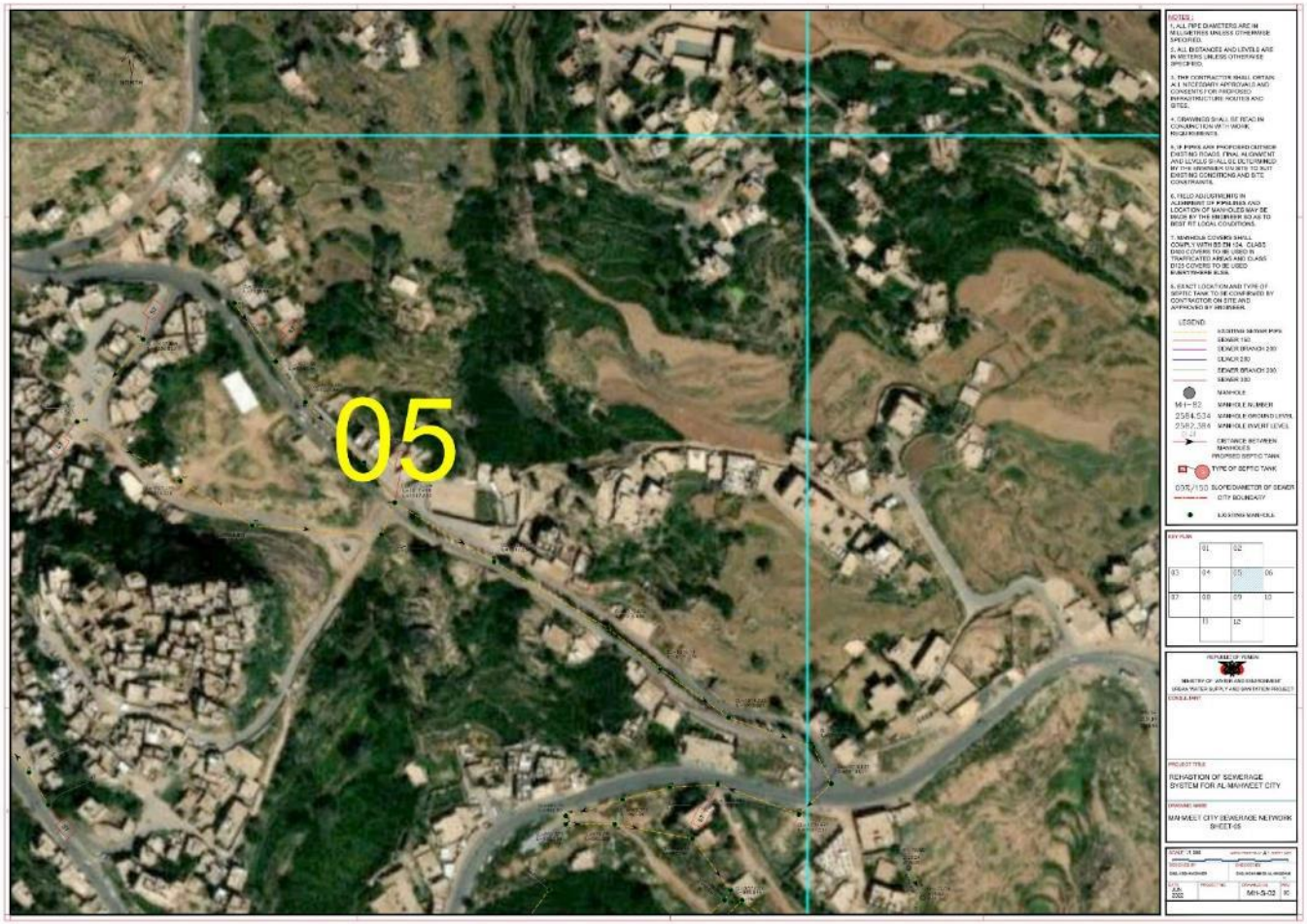
NOTES:
LEGEND:
EXISTING SEWER PIPE
SEWER 150
SEWER BRANCH 200
SEWER 250
SEWER BRANCH 200
SEWER 300
MANHOLE
MANHOLE NUMBER
MANHOLE GROUND LEVEL
MANHOLE INVERT LEVEL
DISTANCE BETWEEN MANHOLES
PROPSED SEPTIC TANK
TYPE OF SEPTIC TANK
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
URBAN WATER SUPPLY AND SANITATION PROJECT
PROJECT TITLE
REHABITATION OF SEWERAGE SYSTEM FOR AL MAHWEET CITY
DRAWING NAME
MAHWEET CITY SEWERAGE NETWORK SHEET 04
MH-S-02


05
NOTES :
1. ALL PIPE DIAMETERS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL DISTANCES AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS AND CONSENTS FOR PROPOSED INFRASTRUCTURE ROUTES AND SITES.
4. DRAWINGS SHALL BE READ IN CONJUNCTION WITH WORK REQUIREMENTS.
5. IF PIPES ARE PROPOSED OUTSIDE EXISTING ROADS, FINAL ALIGNMENT AND LEVELS SHALL BE DETERMINED BY THE ENGINEER ON SITE TO SUIT EXISTING CONDITIONS AND SITE CONSTRAINTS.
6. FIELD ADJUSTMENTS IN ALIGNMENT OF POPULINES AND LOCATION OF MANHOLES MAY BE MADE BY THE ENGINEER SO AS TO BEST FIT LOCAL CONDITIONS.
7. MANHOLE COVERS SHALL COMPLY WITH BS EN 124. CLASS D400 COVERS TO BE USED IN TRAFFICATED AREAS AND CLASS B125 COVERS TO BE USED IN FOOTPATH AND BLISS.
8. EXACT LOCATION AND TYPE OF SEPTIC TANK TO BE CONFIRMED BY CONTRACTOR ON SITE AND APPROVED BY ENGINEER.
LEGEND
SEWER 150
SEWER BRANCH 200
SEWER 250
SEWER BRANCH 300
SEWER 300
MANHOLE
MH-82 MANHOLE NUMBER
2584.534 MANHOLE GROUND LEVEL
2582.384 MANHOLE INVERT LEVEL
DISTANCE BETWEEN MANHOLES
PROPOSED SEPTIC TANK
TYPE OF SEPTIC TANK
0.5%/150 SLOPE/DIAMETER OF SEWER
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
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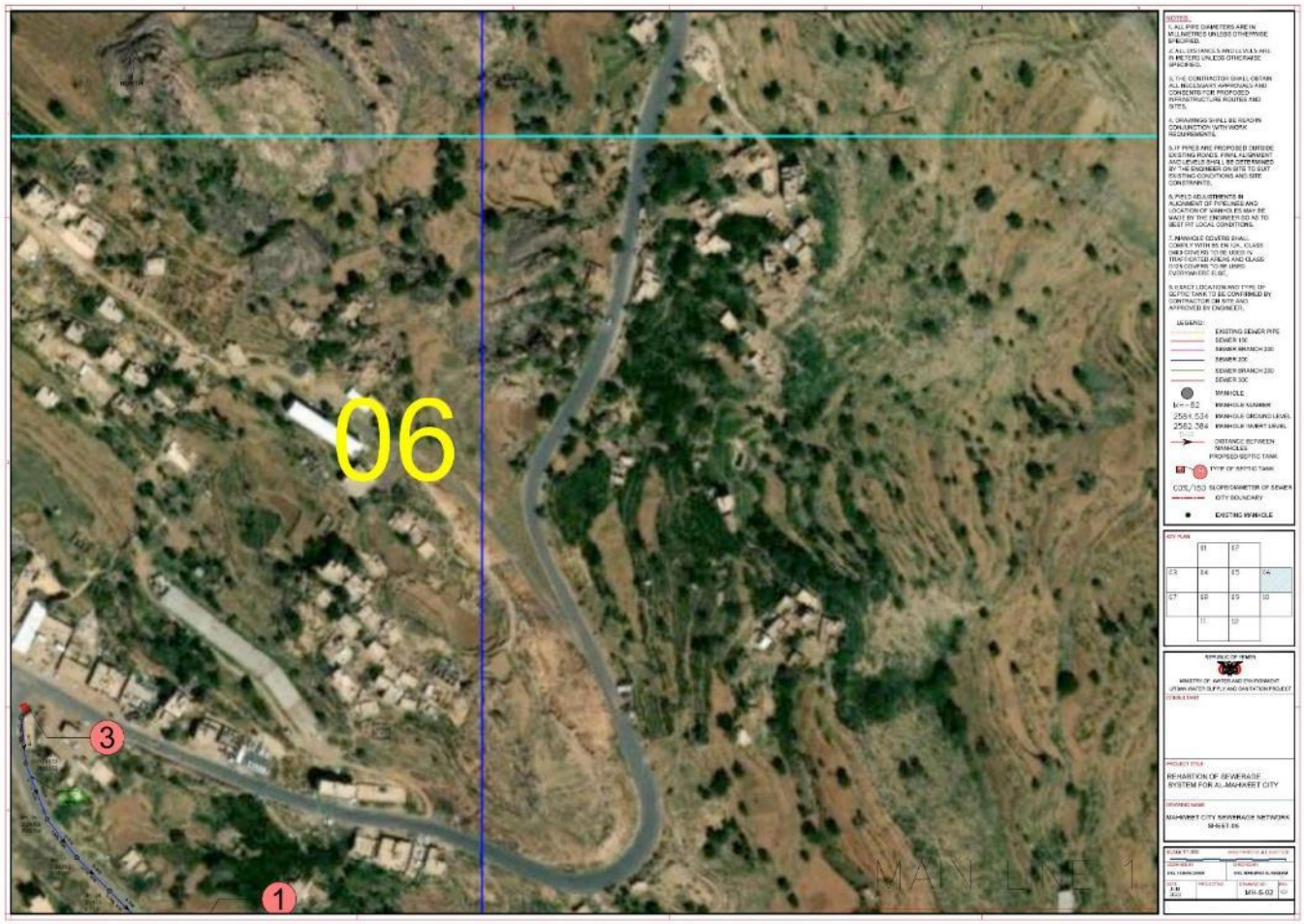
REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
CONSULTANT
PROJECT TITLE
REHABITION OF SEWERAGE SYSTEM FOR AL MAHWEET CITY
DRAWING NAME
MAHWEET CITY SEWERAGE NETWORK SHEET-05
SCALE : 1:500
DRAWING NO.
MH-5-02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MAIN LINE 1
REHABITION OF SEWERAGE SYSTEM FOR ALMAHAREET CITY
MH-6-02


07
NOTES:
1. ALL PIPE DIAMETERS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL DISTANCES AND LEVELS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS AND CONSENTS FOR PROPOSED INFRASTRUCTURE WORKS AND SITES.
4. DRAWINGS SHALL BE READ IN CONJUNCTION WITH WORK REQUIREMENTS.
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6. FIELD ADJUSTMENTS IN ALIGNMENT OF PIPELINES AND LOCATION OF MANHOLES MAY BE MADE BY THE ENGINEER SO AS TO BEST FIT LOCAL CONDITIONS.
7. MANHOLE COVERS SHALL COMPLY WITH BS EN 124. CLASS D400 COVERS TO BE USED IN TRAFFICATED AREAS AND CLASS B125 COVERS TO BE USED EVERYWHERE ELSE.
8. EXACT LOCATION AND TYPE OF SEPTIC TANK TO BE CONFIRMED BY CONTRACTOR ON SITE AND APPROVED BY ENGINEER.
LEGEND
EXISTING SEWER PIPE
SEWER 100
SEWER BRANCH 200
SEWER 200
SEWER BRANCH 300
SEWER 300
MANHOLE
MH-02 MANHOLE NUMBER
2584.534 MANHOLE GROUND LEVEL
2582.384 MANHOLE INVERT LEVEL
DISTANCE BETWEEN MANHOLES
PROPOSED SEPTIC TANK
TYPE OF SEPTIC TANK
DIA/150 SLOPE/DIAMETER OF SEWER
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
CONSULTANT
PROJECT TITLE
REHABITION OF SEWERAGE SYSTEM FOR AL MAHWEET CITY
DRAWING NAME
MAHWEET CITY SEWERAGE NETWORK SHEET-07
MH-S-02


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2
NOTES
1. ALL PIPE DIAMETERS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVALS AND CONSENTS FOR PROPOSED INFRASTRUCTURE ROUTES AND SITES.
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6. FIELD ADJUSTMENTS IN ALIGNMENT OF PIPELINES AND LOCATION OF MANHOLES MAY BE MADE BY THE ENGINEER SO AS TO SUIT KIT LOCAL CONDITIONS.
7. MANHOLE COVERS SHALL COMPLY WITH BS EN 124. CLASS D400 COVERS TO BE USED IN TRAFFICATED AREAS AND CLASS B125 COVERS TO BE USED EVERYWHERE ELSE.
8. EXACT LOCATION AND TYPE OF SEPTIC TANK TO BE CONFIRMED BY CONTRACTOR ON SITE AND APPROVED BY ENGINEER.
LEGEND
EXISTING SEWER PIPE
SEWER 150
SEWER BRANCH 200
SEWER 250
SEWER BRANCH 200
SEWER 200
MANHOLE
MH - 82 MANHOLE NUMBER
2584.534 MANHOLE CROWN LEVEL
2582.384 MANHOLE INVERT LEVEL
DISTANCE BETWEEN MANHOLES
PROPOSED SEPTIC TANK
TYPE OF SEPTIC TANK
SLOPE/DIAMETER OF SEWER
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
CONSULTANT
PROJECT TITLE
REHABITION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
DRAWING TITLE
MAHWEET CITY SEWERAGE NETWORK SHEET-08
MH-S-02


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SEC 2
REHABITION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
MAHWEET CITY SEWERAGE NETWORK SHEET-09


SEC.1
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REHABITION OF SEWERAGE SYSTEM FOR AL MAHWEET CITY
MAHWEET CITY SEWERAGE NETWORK SHEET-10


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NOTES:
LEGEND:
EXISTING SEWER PIPE
SEWER 150
SEWER BRANCH 200
SEWER 200
SEWER BRANCH 250
SEWER 300
MANHOLE
MH-82
MANHOLE NUMBER
2584.534
MANHOLE GROUND LEVEL
2582.184
MANHOLE INVERT LEVEL
(84)
DISTANCE BETWEEN MANHOLES
PROPOSED SEPTIC TANK
TYPE OF SEPTIC TANK
00%/150
SLOPE/DIAMETER OF SEWER
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
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REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
CONSULTANT
PROJECT TITLE
REHABITION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
DRAWING NAME
MAHWEET CITY SEWERAGE NETWORK SHEET-11
SCALE 1:2000
DRAWING NO.
MH-S-82


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NOTES:
1. ALL PIPE DIAMETERS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL DISTANCES AND LEVELS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
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8. EXACT LOCATION AND TYPE OF SEPTIC TANK TO BE CONFIRMED BY CONTRACTOR ON SITE AND APPROVED BY ENGINEER.
LEGEND:
EXISTING SEWER PIPE
SEWER 150
SEWER BRANCH 200
SEWER 200
SEWER BRANCH 250
SEWER 300
MANHOLE
MH-82
MANHOLE NUMBER
2584.534
MANHOLE GROUND LEVEL
2582.184
MANHOLE INVERT LEVEL
D-10
DISTANCE BETWEEN MANHOLES
PROPOSED SEPTIC TANK
TYPE OF SEPTIC TANK
00%/150
SLOPE/DIAMETER OF SEWER
CITY BOUNDARY
EXISTING MANHOLE
KEY PLAN
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REPUBLIC OF YEMEN
MINISTRY OF WATER AND ENVIRONMENT
URBAN WATER SUPPLY AND SANITATION PROJECT
CONSULTANT
PROJECT TITLE
REHABITION OF SEWERAGE SYSTEM FOR AL-MAHWEET CITY
DRAWING NAME
MAHWEET CITY SEWERAGE NETWORK SHEET-12
SCALE 1:2000
MH-S-82