Initial Environmental Examination

March 2016

Philippines: Water District Development Sector Project

SEPTAGE TREATMENT SUBPOJECT FOR CITY OF KORONADAL
CITY OF KORONADAL WATER DISTRICT

Prepared by Local Water Utilities Administration for the Asian Development Bank. This is an updated version of the draft originally posted in March 2014 available on http://www.adb.org/sites/default/files/project-document/80456/41665-013-iee-01.pdf.

CURRENCY EQUIVALENTS

(as of 22 January 2016)

Currency unit	–	peso (Php)
Php1.00	=	$0.02097
$1.00	=	Php 47.687

ABBREVIATIONS

ADB	–	Asian Development Bank
CEMP	–	Contractor's Environmental Management Plan
CIA	–	cumulative impact assessment
CKWD	–	City of Koronadal Water District
CNC	–	Certificate of Non-Coverage
DAO	–	Department Administrative Order
DENR	–	Department of Environment and Natural Resources
ECC	–	Environmental Compliance Certificate
EIA	–	environmental impact assessment
EIS	–	Environmental Impact Statement
EMB	–	Environmental Management Bureau
EMP	–	Environmental Management Plan
GHG	–	greenhouse gas
GRM	–	Grievance Redress Mechanism
IEE	–	initial environmental examination
LGU	–	local government unit
LWUA	–	Local Water Utilities Administration
MC	–	Memorandum Circular
NGO	–	non-government organization
NIA	–	National Irrigation Administration
NWRB	–	National Water Resources Board
PD	–	Presidential Decree
PEISS	–	Philippine Environmental Impact Statement System
PIU	–	project Implementation unit
PMU	–	project management unit
PNSDW	–	Philippine National Standards for Drinking Water
RA	–	Republic Act
REA	–	Rapid Environmental Assessment
RO	–	Regional Office
SpTF	–	Septage Treatment Facility
SPS	–	Safeguards Policy Statement
WD	–	water district
WDDSP	–	Water District Development Sector Project
WDGRC	–	Water District Grievance Redress Committee
WHO	–	World Health Organization

WEIGHTS AND MEASURES

ha	–	hectare
HP	–	horsepower
km	–	kilometer
KVA	–	Kilo volt ampere
lps	–	liters per second
m	–	meter
m^2	–	square meter
m^3	–	cubic meter
mg/L	–	milligrams per liter
mm	–	millimeter
MPN	–	most probable number
PCU	–	platinum cobalt unit

NOTE

In this report, "$" refers to US dollars.

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EXECUTIVE SUMMARY

1. **Background.** The City of Koronadal Water District (CKWD) is an operational water supply utility located in the City of Koronadal, South Cotabato, Republic of the Philippines and one of the selected pilot water districts (WDs) under the project preparatory technical assistance for the PHI: Water District Development Sector Project (Project) funded by the Asian Development Bank (ADB) with a water supply subproject and a sanitation subproject. The Project intends to improve the livability and competitiveness in urban areas outside of Metro Manila through the provision of better water supply and sanitation infrastructure and services to a number of WDs. The Local Water Utilities Administration (LWUA) is the executing agency. The participating WDs, in this case CKWD, are the implementing agencies for their respective water supply and sanitation subprojects.

2. **Environmental safeguard.** An environmental assessment was conducted for the proposed sanitation subproject of CKWD, a septage treatment system for the City of Koronadal, South Cotabato. The septage treatment facility (SpTF) is intended to treat the septage from households and commercial establishments in the city. The facility will be located in Purok Pag-asa, Brgy. Paraiso, City of Koronadal. Relative to the significance of impacts and risks, this subproject has been determined to be Environmental Category B based on ADB's environmental categorization and the type of assessment, requiring the preparation of an Initial Environmental Examination (IEE) report. This IEE was carried out in accordance with ADB's Safeguards Policy Statement *(2009)* ADB SPS (2009).

3. **Legal framework.** The assessment was also carried out within the policy, legal, and administrative frameworks relevant to the environmental assessment of wastewater treatment systems in the Republic of the Philippines. These include the following laws and regulations: (i) Presidential Decree (PD) 198 - Provincial Water Utilities Act of 1973, (ii) PD 1586 - Establishing the Philippine Environmental Impact Statement System, and (iii) Republic Act No. 9275 - Philippine Clean Water Act of 2004. The overall institutional framework is the LWUA-and- WD setup as defined by PD 198.

4. **Subproject description.** The proposed septage management program of the city will be implemented in two phases: (i) Phase I covers the promulgation of a city ordinance on septage management, information campaign on sanitation, and inventory of septic tanks from 2014-2015, and (ii) Phase II covers the procurement of vacuum trucks for mandatory desludging of septic tanks, transport and treatment of septage in a SpTF prior to discharge of domestic wastewater that is compliant with the provisions of the Philippine Clean Water Act of 2004 and its implementing rules and regulations. Phase II will be implemented from 2016-2018. The proposed subproject will help improve public health of the urban population and enhance the development of water supply and sanitation infrastructures.

5. **Environmental management plan (EMP).** The environmental assessment process has highlighted the environmental issues and concerns of the proposed subproject. It has not identified any significant negative environmental impacts that cannot be mitigated. The environmental assessment considered the fact that proposed site for the SpTF is beside the proposed sanitary landfill of the city and will have no significant negative impact on the surrounding residential and agricultural landscape.

Collection and transport of septage will be undertaken in accordance with the septage management ordinance to be promulgated by the city government.

6. **Public consultation**. The public participation process included (i) identifying interested and affected parties (stakeholders); (ii) informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; (iii) creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regard to the proposed development; (iv) giving the stakeholders feedback on process findings and recommendations; and (v) ensuring compliance to process requirements with regards to the environmental and related legislation. A series of consultations was conducted with various stakeholders on 18 August 2009, 22 November 2012, and 14 January 2013. The IEE includes the activities that will be undertaken during project design to engage the stakeholders, and planned information disclosure measures and processes for carrying out consultations during project implementation.

7. **Grievance redress mechanism**. A common grievance redress mechanism (GRM) will be in place at the WD for social, environmental, or any other grievances related to the WD's subprojects; the resettlement plan and IEE will follow the grievance redress mechanism described in this report, which is developed in consultation with key stakeholders. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM for the project have time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

8. **Categorization**. Based on this IEE, the determination of environment category as "B" in accordance with ADB's SPS (2009) is confirmed. With the implementation of the mitigation measures as proposed in the EMP, the subproject is not expected to cause irreversible adverse environment impacts. Also, the sanitation subproject can be implemented in an environmentally acceptable manner without the need for further environmental assessment study. Under the Philippine Environmental Impact Statement System (PEISS), sewage treatment with more than 5,000 cubic meters (m^3) of waste to be treated annually requires submission of an environmental impact statement (EIS) to the Environmental Management Bureau-Regional Office (EMB-RO) for securing an Environmental Compliance Certificate (ECC). In this regard, this IEE will greatly help CKWD in complying with the requirements of the PEISS.

LOCATION MAP

I. INTRODUCTION

1. In 2000, it was estimated that 73% to 74% of the population in the Philippines had access to sanitation but only 4% to 5% were connected to sewerage systems.[1] Coverage in 2004 ranged from 72% to 86.2%. The data only refers to sanitary facilities but not the entire sanitation (e.g., from collection to disposal). Domestic wastewater largely goes untreated and majority of the population is exposed to raw sewage.

2. Most water utilities focus only on water supply services. While the local government units (LGUs) are mandated to provide essential services, including water and sanitation services, 97% of its investments are for water supply and only 3% is for sanitation and wastewater treatment.[2]

3. The City of Koronadal Water District (CKWD) is an operational water utility located in the City of Koronadal, South Cotabato and one of the selected pilots under project preparatory technical assistance for the PHI: Water District Development Sector Project (Project). The expected impact of the Project is improved health and living conditions for the communities served by the participating WDs. The expected outcome is increased access to improved water supply and sanitation services. The Local Water Utilities Administration (LWUA) is the executing agency (EA). The participating water districts (WDs), in this case CKWD, are the implementing agencies (IA) for their respective water supply and sanitation subprojects.

4. To initiate a joint LGU/CKWD septage management strategy, and in adherence to national policies on sanitation, it is expected that a local ordinance will be issued by the city government of Koronadal to require mandatory desludging and support implementation requirements and arrangements. Strategic actions to implement the proposed septage management system would include (i) inspection and repair of septic tanks, (ii) sanitation system for the poor communities, (iii) collection of septage through desludging, (iv) septage treatment. (v) payment of septage services, (vi) land acquisition for the treatment facility, (vii) operation and maintenance, (viii) capacity building, (ix) information campaign, and (x) monitoring and evaluation.

5. Preparation of this Initial Environmental Examination (IEE) is part of the activities of the Project. It provides the Asian Development Bank (ADB) with an assessment of the environmental concerns to be considered regarding the subproject location, design, construction, operation and maintenance (O&M). This report is also intended to assist LWUA and CKWD in the preparation of the required environmental reports to meet the Department of Environment and Natural Resources (DENR) requirements for an application of the necessary Environmental Compliance Certificate (ECC) before the start of the construction activities.

6. This IEE is prepared for the proposed septage treatment system of CKWD comprised of the construction of septage treatment facility (SpTF) in Brgy. Paraiso, City of Koronadal, the procurement of vacuum trucks, desludging of septic tanks, and operation and maintenance of the SpTF. A detailed description of the proposed system is presented in **Section III.**

[1] Philippine Water Situation Report. 2006.
[2] Philippine Water Supply Roadmap. 2008.

7. Preparation of the IEE involved field visits to the proposed subproject area, review of available information, discussions with CKWD, LWUA, DENR, and other government agencies, local government officials, and members of the community within the subproject area. The environmental impacts of the proposed septage treatment system have been identified and assessed as part of the planning and design process, and actions will be taken to reduce negative impacts to acceptable levels. An environmental assessment using ADB's Rapid Environmental Assessment (REA) Checklist for sewage treatment **(Appendix A)** was conducted, and results of the assessment show that the project is unlikely to cause significant adverse impacts. Thus, this IEE has been prepared in accordance with ADB Safeguard Policy Statement (2009) (ADB SPS [2009]) requirements for environment category B projects and to meet the following objectives:

(i) To provide critical facts, significant findings, and recommended actions;

(ii) To present the national and local legal and institutional framework within which the environmental assessment has been carried out;

(iii) To provide information on the existing geographic, ecological, social, and temporal contexts, including associated facilities within the project's area of influence;

(iv) To assess the project's likely positive and negative direct and indirect impacts on physical, biological, socioeconomic, and physical cultural resources in the project's area of influence;

(v) To identify mitigation measures and any residual negative impacts that cannot be mitigated;

(vi) To describe the process undertaken during project design to engage stakeholders, the planned information disclosure measures, and the process for carrying out consultation with affected people and facilitating their participation during project implementation;

(vii) To describe the project's grievance redress mechanism for resolving complaints about environmental performance;

(viii) To present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts;

(ix) To describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and

(x) To identify who is responsible for carrying out the mitigation and monitoring measures.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

8. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS(2009). This states that ADB requires environmental assessment of all project loans,

program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

9. **Screening and categorization.** The nature of the environmental assessment required for a subproject depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.

(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.

(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

10. **Environmental management plan (EMP).** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks.

11. **Public disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

(i) for environmental category A projects, draft EIA report at least 120 days before Board consideration;

(ii) final or updated EIA and/or IEE upon receipt; and

(iii) environmental monitoring reports submitted by the project management unit (PMU) during project implementation upon receipt.

B. National Laws

12. The policy, legal, and administrative frameworks relevant to the environmental assessment of water supply and sanitation projects in the Philippines have long been established by the following laws and regulations: (i) Presidential Decree (PD) 198 - Provincial Water Utilities Act of 1973, (ii) PD 1586 - Establishing the Philippine Environmental Impact Statement System, (iii) Republic Act (RA) No. 9275 - Philippine Clean Water Act of 2004, (iv) PD 856 - Code on Sanitation of the Philippines, (v)

Republic Act No. 7150 – Local Government Code of 1991. The frameworks apply to CKWD's sanitation subproject.

13. The overall institutional framework is the LWUA-and-WD setup as defined by PD 198 (Provincial Water Utilities Act of 1973). LWUA, as a government corporation, is mandated to promote the development of WDs in the country. It has a clear mandate to "primarily be a specialized lending institution for the promotion, development, and financing of local water utilities." To carry out this mandate LWUA has major subsidiary roles such as: (i) prescribing minimum standards and regulations in order to assure acceptable standards of construction materials and supplies, maintenance, operation, personnel training, accounting, and fiscal practices for local water utilities; and (ii) providing technical assistance and personnel training programs.

14. PD 198 also mandated the formation of local WDs, which were initially formed by resolutions of the LGUs (generally, municipalities), to serve a single LGU or a cluster of LGUs. Once formed, a WD becomes legally autonomous of the LGU and has the standing and legal character of an independent government-owned and controlled corporation. It is controlled by a board of directors, appointed by either the mayor or the governor, consisting of five members representing various sectors, who in turn appoint the WD's general manager. LWUA has overall responsibility for project coordination, implementation, and liaison with ADB and other government offices. The Project can contribute to Philippine's efforts in achieving relevant targets in the Millennium Development Goals (MDGs). Most relevant to the Project is Goal 7 (Ensure environmental sustainability) with its "Target 7C" for 2015 calling to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation. Achieving the MDG7 2015 target on accessibility to safe drinking water necessitates an assurance that indeed the water is safe. WDs must have raw water sources with sustainable quantities and acceptable quality. They should be able to maintain acceptable water quality levels in the distribution systems to ensure delivery of potable water. The 7C Philippine target is 86.8% of Filipinos will have access to safe water by 2015 and 83.8% will have access to a sanitary toilet facility.

15. The environmental assessment requirement is covered by PD 1586 (Establishing the Philippine Environmental Impact Statement System) as well as its implementing rules and regulations issued under DENR Administrative Order No. 30 series of 2003 (DAO 2003-30). The Philippine Environmental Impact Statement System (PEISS) requires the project proponent to obtain an ECC from the Environmental Management Bureau (EMB) before an infrastructure or development project can be implemented. The Philippine environmental assessment system conforms with ADB's environmental assessment requirements under ADB's *Special Evaluation Study on Environmental Safeguards (2006)*.

16. Sewerage and septage management are covered by Republic Act No. 9275 (The Philippine Clean Water Act of 2004). The implementing rules and regulations are issued under DENR Administrative Order No.10 series of 2005 (DAO 2005-10). Standards for the discharge of all industrial and municipal wastewaters are defined in DENR Administrative Order No. 35 series of 1990 (The Revised Effluent Regulations of 1990) which is based on PD 984 (the Philippine Pollution Control Decree of 1976). Sanitation and septic tanks are also covered by PD 856 (Code on Sanitation of the Philippines). The project proponent must secure a discharge permit from the Environmental Management Bureau-Regional Office (EMB-RO), to confirm the facility's compliance with

the prescribed effluent standards. A Permit to Cut will also need to be secured, if trees have to be cut.

17. **Table 1** presents the summary of environmental regulations and mandatory requirements for the proposed subproject.

Table 1: Summary of Applicable Environmental Regulations

Laws, Rules and Regulations	Description/Salient Features	Permit/Clearance	Required for the Project
PD 1586 and its implementing rules and regulations	Requires project proponents to secure an ECC from DENR before an infrastructure project is constructed. DAO 03-30 provides the implementing rules and regulations for PD 1586 and the Revised Procedural Manual of DAO 03-30 integrates DENR policies to promote EIA as a planning and decision-making tool. DENR MC No. 2011-005 further streamlined the PEISS.	ECC for proposed subprojects under the EIS system or Certificate of Non-Coverage (CNC) for proposed projects not covered by the system.	EIS Report is required for septage treatment system with more than 5,000 m^3 of waste to be treated annually. The EIS shall be submitted to the EMB-Reg. XII for processing and issuance of an ECC.
Philippine Clean Water Act of 2004 (RA 9275) and its implementing rules and regulations	Provides the policy and regulations for the prevention, control and abatement of pollution in the country's water resources for sustainable development.	Requires Wastewater Discharge Permit for facilities that discharge regulated effluents	Discharge Permit for the SpTF shall be secured from EMB-RO XII when it becomes operational.
DENR Administrative Order No. 35, series of 1990	Known as Revised Effluent Regulations of 1990, the order sets the effluent standards for discharge into the receiving water bodies.	Compliance with the effluent standards is the primary basis for issuance of Wastewater Discharge Permit	Discharge Permit valid from 1-3 years is issued upon compliance with DAO No. 35 and payment of necessary fees.
Water Code of the Philippines (PD 1067) and its amended implementing rules and regulations	Establishes the principles for appropriation, control and conservation of water resources in the country and defines the rights and obligations of water users.	Water Permit and Permit to Drill from the NWRB	Not applicable.
Permit to Cut Trees	Required by the DENR before cutting any tree in both public and private properties.	Permit to Cut is secured from the EMB-RO where the tree/s to be cut are located	To be secured if trees would be cut during construction or operation of the SpTF.

CNC = Certificate of Non-Coverage, DAO=Department Administrative Order, DENR=Department of Environment and Natural Resources, ECC=Environmental Compliance Certificate, EIS = Environmental Impact Statement, EMB-RO=Environmental Management Bureau–Regional Office, IEE=Initial Environmental Examination, m^3 = cubic meters, MC=Memorandum Circular, NWRB = National Water Resources Board, PD=Presidential Decree, PEISS=Philippine Environmental Impact Statement System, RA=Republic Act, , SpTF=Septage Treatment Facility.

III. DESCRIPTION OF THE PROJECT

A. Design of the Septage Management System

18. The proposed septage management program of the City of Koronadal will be implemented in two phases: (i) Phase I covers the promulgation of a city ordinance on septage management, an information campaign on sanitation, and an inventory of septic tanks from2016-2018, and (ii) Phase II covers the procurement of vacuum trucks for desludging of septic tanks, transport and treatment of septage in a septage treatment facility (SpTF) prior to discharge of domestic wastewater that is compliant with the provisions of the Philippine Clean Water Act of 2004 and its implementing rules and regulations. Phase II will be implemented from 2019 to 2020. The proposed subproject will help improve public health of the urban population and enhance the development of water supply and sanitation infrastructures.

19. The SpTF will have a design load of 45 cubic meters per day (m^3/day) based on the design parameters presented in **Table 2.** This load will require a 1.06 hectares (ha) parcel of land. Total investment for the subproject will amount to Php 66.576 million **(Table 3).** The operation and maintenance cost (O&M) has a total amount of Php 2.48 million as shown in **Table 4.**

Table 2: Design Parameters

Design Parameters	Dimension	2012	2025
Population		161,981	199,105
Influent BOD concentration	mg/L	1,000-3,500	1,000-3,500
Treated BOD concentration	mg/L	50	50
Households (HH)		33,444	41,137
HH with septic tanks (ST)	units	15,132	24,682
	%	45.24	60.00
HH ST for rehabilitation	%	5.00	
Number of ST for rehabilitation	units	757	
Accessible HH ST	%	70	80
HH that will participate in the program	%	80	90
Ave volume of ST	m^3	3	3
Commercial establishment with ST	units	1,000	1,200
Ave volume of ST (commercial)	m^3	6	6
Accessible commercial ST	%	80	90
Commercial establishment that will participate in the program	%	80	90
Frequency of desludging	years	5	5
Design flow for desludging			
Design flow (per 5 years)	m^3	29,262	59,146
Design flow (per year)	m^3	5,852	11,829
Design flow (per month)	m^3	488	986
Design flow (per day),Q	m^3	22	45
Design value	m^3/day	25	45

BOD=Biochemical oxygen demand, HH = householdsmg/L=milligrams per liter, m^3=cubic meter, Q=volumetric flowrate.
Source: PPTA Consultant.

Table 3: Investment Items for the Septage Treatment System

Component	Cost (Php '000)
Septage treatment facility	27,500
Vacuum trucks	9,000
Training/IEC	1,720
Detailed Engineering Design	2,937
Construction Supervision	1,958
Physical Contingency	9,850
Price Contingency	11,061
Land Acquisition– 1.06 hectares	2,550
Total	**66,576**

IEC=Information, Education, and Communication, Php = Philippine Peso
Source: PPTA Consultant.

Table 4: Annual Operation and Maintenance Cost

Item	Qty.	Unit	Unit Cost (Php)	Total Cost (Php)
Septage treatment facility				
Plant Manager	1	person	15,000	180,000
Plant Operator	1	person	10,000	120,000
Administrative assistant	1	person	7,000	84,000
Security	1	person	5,000	60,000
Laborers	2	person	4,000	96,000
Electricity	1	annual	20,000	20,000
Water Quality Testing	1	annual	50,000	50,000
Office/Maintenance Supplies	1	annual	20,000	20,000
Rental of truck with laborers for cleaning ponds	2	every 6 months	60,000	120,000
Sub-total				**750,000**
Desludging				
Desludging Unit Head	1	person	12,000	144,000
Admin assistant	1	person	7,000	84,000
Drivers	2	person	6,000	144,000
Desludging assistants/helpers	6	person	4,000	288,000
Protective gear for operation team	1	annual	50,000	50,000
Office/Maintenance Supplies	1	annual	20,000	20,000
Tipping Fee for Sludge	1500	septic tank	300	450,000
Gasoline and Lubricants	1	annual	200,000	200,000
Barangay incentives for desludging	1500	septic tank	200	300,000
Repair of vehicles	1	annual	50,000	50,000

Item	Qty.	Unit	Unit Cost (Php)	Total Cost (Php)
Sub-total				**1,730,000**
Total				**2,480,000**

Source: PPTA Consultant.

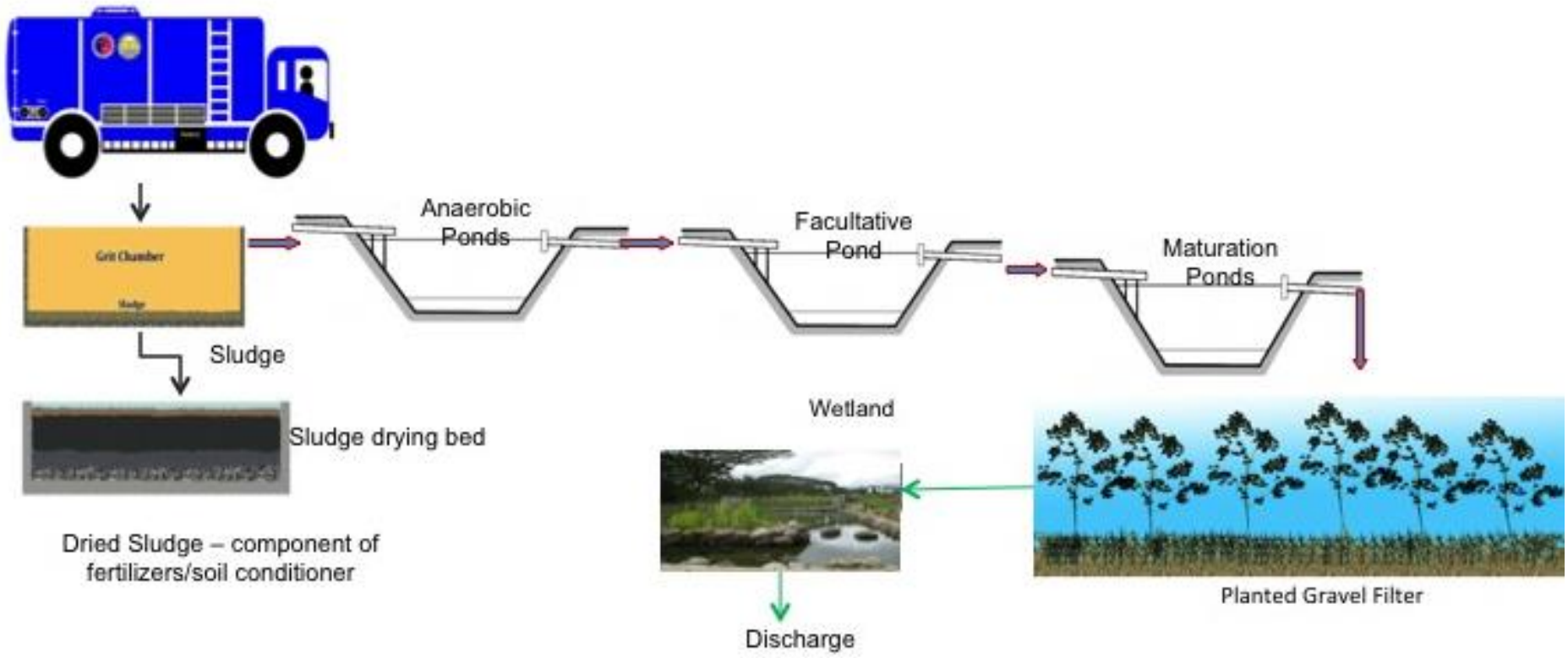
20. **Septage treatment system.** The proposed SpTF will be similar to the Dumaguete septage treatment system comprised of waste stabilization ponds with one grit chamber with removable basket screens, one sludge drying bed, three anaerobic ponds, one facultative pond, three maturation ponds, one planted gravel filter, and one constructed wetland, and chlorination chamber. It will be able to treat influent biochemical oxygen demand (BOD) concentration ranging from 1,000-3,500 milligrams per liter (mg/L) down to 50 mg/L as well as other parameters required by DENR DAO No. 35, series of 1990 for Class Inland Waters Class C as shown in **Table 5**. The sludge from the ponds will be dried in the sludge drying bed. The resulting bio-solids will be used as soil conditioner in nearby farms if possible, or at the city's sanitary landfill. The treatment system is illustrated in **Figure 1.**

Table 5: Effluent Limits (Performance Indicators)

Parameter	Unit	Value
pH	range	6.5-9.0
Chemical oxygen demand	mg/L	100
5-day 20^{o}C BOD	mg/L	50
Total suspended solids	mg/L	70
Oil/grease	mg/L	5.0
Total coliforms	MPN/100 mL	10,000
Color	PCU	150

BOD=biochemical oxygen demand, mg/L=milligrams per liter, MPN=most probable number, mL=milliliter, PCU=platinum cobalt unit.
Source: DENR Administrative Order No. 35, series of 1990.

Figure 1: Illustration of the Proposed Septage Treatment System



Source: Dumaguete City Engineering Office

B. Implementation Schedule

21. Phase I is being implemented from 2016-2018 and Phase II from 2019-2020. This IEE covers Phase II with the implementation timetable presented in **Figure 2.** The proposed subproject will help improve public health of the urban population and enhance competitiveness of CKWD by developing water supply and sanitation infrastructures.

Figure 2: Implementation Schedule

Activity	Phase 1 (2016-2018)			Phase 2 (2019-2020)	
	2016	2017	2018	2019	2020
A. Project preparation					
• WD-LGU MOA					
• LGU ordinance					
• Memorandum of Agreement re land use					
• Septic tank inventory					
• DED					
• Contracting IEC, capacity building materials					
• Clearances/certificates					
B. Project implementation/ Operation					
• Construction of septage treatment facility					
• Procurement of vacuum trucks					
• Capacity building					
• Information campaign					
• Desludging					
• Repair of septic tanks					
• Water quality testing					
• Cleaning of ponds					
• Monitoring/evaluation					

DED=Detailed Engineering Design, IEC=Information, Education, and Communication, LGU=Local Government Unit, MOA=Memorandum of Agreement, WD=Water District.
Source: PPTA Consultant.

C. Dumaguete Model of Septage Management

22. **Joint undertaking by the LGU and the WD.** The LGU and CKWD will follow the Dumaguete City's model of septage management, with the LGU providing the land for the SpTF and its right of way, and the WD constructing and operating the facility. CKWD participated in the study tour to Dumaguete organized by the PPTA in July 2012. In February 2013 some members of the city council of Koronadal, together with the general manager of CKWD, conducted a study tour of the Dumaguete SpTF.

23. **Septage management ordinance.** The city council of Koronadal was briefed by the PPTA consultant and the CKWD officials about the septage management program and the proposed joint undertaking between the two institutions in January 2013. A copy of the Dumaguete City ordinance and the Memorandum of Agreement (MOA) between Dumaguete City and Dumaguete City Water District were furnished to the city council through the council secretary during the briefing. These can be used as models for the

city government and the CKWD to prepare a similar MOA and for the city government to prepare or improve existing ordinances relating to:

(i) Imposition of repair for septic tanks for all households and commercial establishments;

(ii) Increase in water tariff for desludging fees and sharing of revenues;

(iii) Regulation for tipping fees for desludging services; and

(iv) Sanitary clearances for desludging services.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Methodology Used for the Baseline Study

24. **Data collection and stakeholder consultations.** Data for this study were primarily collected through literature review, discussions with the CKWD officials and staff, stakeholder agencies like the EMB-RO XII and LGUs, and field visits to the proposed subproject site.

25. The literature review broadly covered the following:

(i) Project details, reports, maps, and other documents on WDDSP available at the CKWD office;

(ii) Environmental laws, ruled and regulations of EMB-DENR, and ADB SPS (2009) relevant to the proposed subproject;

(iii) Barangay Development Plan of Brgy. Paraiso.

26. Several visits to the subproject sites were made in November 2012 and January 2013 to assess the existing environment (physical, biological, and socioeconomic) and gather information with regard to the proposed sites and scale of the proposed subproject. A separate socioeconomic study was conducted to determine the demographic information, and settlements.

27. **Data analysis and interpretation.** The data collected were analyzed and interpretations made to assess the physical, biological, and socioeconomic features of the subproject area. The relevant information is presented in the succeeding paragraphs.

B. Physical Resources

28. **Location.** The proposed site for the SpTF is located in Purok Pag-asa, Brgy. Paraiso, City of Koronadal. It is part of the 13.9-ha. property to be acquired by the government of the City of Koronadal from private owners. It lies between (i) 6^{o} 28’ 40.9” north and 124^{o} 49’ 12.8” east; and (ii) 6^{o} 28’ 25.3” north and 124^{o} 49’ 27.4” east, with elevation between 124 meter and 228 meter.

29. The proposed site is a vacant lot covered with tall grasses and shrubs with some bamboos. A small portion of the property has been planted with corn. The 13.9-ha. property is bounded in the north by coconut plantation, in the east by cogon grasses, in

the south by dried creek, and in the west by coconut plantation. A dried creek located on the southern boundary drains into Sarcon Creek, which in turn flows into San Felipe River in the Municipality of Tantangan. San Felipe River is extensively used for irrigation of nearby ricefields in Tantangan.

30. There are no rare or endangered species of flora and fauna since the site used to be a cornfield. A bull was seen grazing on a vacant portion of the property. Other animals observed were dogs, cats, and domesticated chicken roaming freely and owned by residents in the nearby areas.

31. Brgy. Paraiso is located at the northwestern tip of the City of Koronadal. It has a total land area of 2,334 ha. It is bounded on the southwest by the Municipality of Banga, by the Municipality of Tantangan in the north, Brgys. Morales and Zone IV and Sta. Cruz in the east and Brgys. Mambucal and Assumption in the south. The map of Brgy. Paraiso showing the indicative location of the proposed SpTF is presented in **Figure 3.**

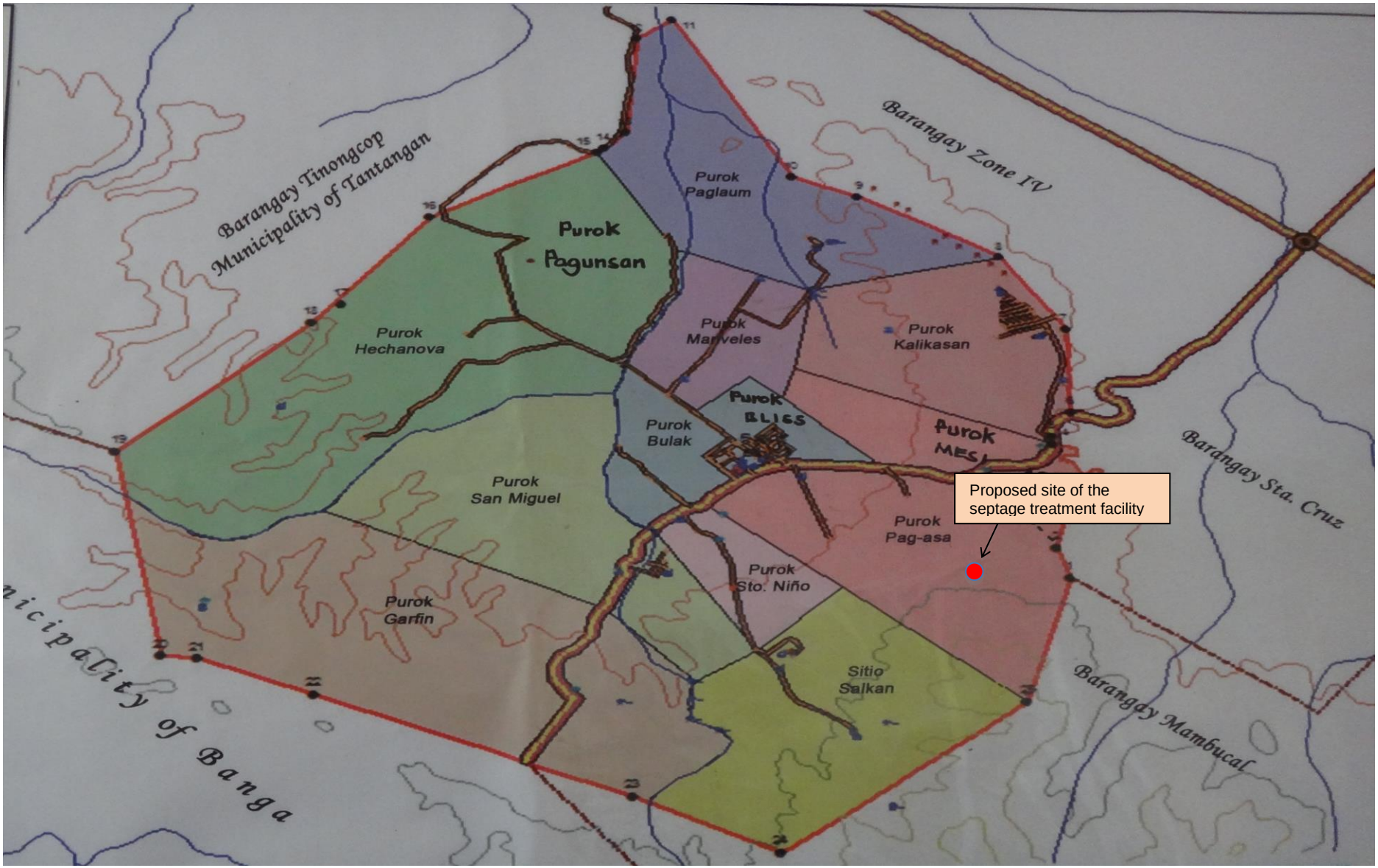
32. **Topography.** The City of Koronadal is approximately 50% (13,900 of 27,700 ha.), is predominantly flat with slopes between 0% to 3%. Its mountain ranges have peaks reaching as high as 700 m to 800 meters above sea level (masl) and gradually dropping towards the center of the city.

33. **Geology and soils.** The city is underlained with alluvial deposits and sedimentary rocks mostly limestone and sandstone of Miocene and Pleistocene Age, which overly the Basement Complex of plutonic origin. It is located east of a structural complex characterized by the Roxas and Matulas Anticlines. It has four types of soils, namely: San Manuel fine sandy loam (Koronadal fine sandy loam), New Iloilo sandy loam (Bulol sandy loam), Nupol sandy loam and Faraon clay loam. The identified San Manuel fine sandy loam locally known as koronadal fine sandy loam type of soil with alluvials deposits from mixed origin is found at the low land areas. A large portion of Koronadal's land area (62.7% of total) consists of San Manuel fine sandy loam.

34. **Water resources.** Two major rivers identified in the City of Koronadal, the Marbel River and the Taplan River, originate from the Roxas and Quezon mountain ranges and flow through the Koronadal valley. Marbel River originates from the eastern flanks of the Roxas mountains about 15 kilometers south of the city proper. It flows in a north-northwesterly direction and drains into the Buluan Lake and is currently being used by the National Irrigation Administration (NIA) to irrigate a big portion of the Koronadal lowlands. Throughout the length of the river, several intake structures have been built also for irrigation purposes.

35. Extensive allocation of the waters from the Marbel and Taplan Rivers for agricultural projects substantially reduces the water supply potential of both rivers for domestic purposes. Moreover, surface water is generally more prone to pollution and contamination and will require high costs for physical and chemical treatment.

Figure 3: Map of Brgy. Paraiso, City of Koronadal with the Indicative Site of the Septage Treatment Facility



Source: Brgy. Paraiso, City of Koronadal. 2012.

36. Springs of small to medium capacities also exist in the limestone formation along the slopes of the Roxas and Quezon mountain ranges. The largest of the springs inventoried, the Morales Spring with an estimated discharge of 35 liters per second (lps), is being used for irrigation purposes, while the other small capacity springs are being used as water sources of the barangays outside the CKWD's service area. Utilization of these springs is not recommended due to the limiting factors of elevation, discharge capacity and distance to the proposed service areas.

37. The present source of water for domestic, commercial and institutional demands in City of Koronadal is groundwater through wells. CKWD has already six deep well sources, five of which are operational while the other one is about to be commissioned. The wells have diameters ranging from 200 to 250 millimeters (mm), depths ranging from 85 to 120 meters and discharge capacities ranging from 15 to 40 lps. Although most of the existing wells showed high concentration of manganese, the newly drilled Sta. Cruz Well and San Isidro Well located southwest of the City of Koronadal along the limestone formation showed better water quality as compared with the wells drilled in the north and to the southeast along the alluvial formation. **Table 5** presents a sample of water quality from a deepwell in the neighboring barangay of Sta. Cruz.

38. Groundwater flows from the recharge areas in the Roxas Mountain Range and the Quezon Mountain Range towards the flat areas of the Koronadal Valley in a north-northwest trend. The piezometric gradient appears to be relatively gentle with slopes that vary from 0.010 to 0.025.

39. Geo-resistivity surveys were carried out by LWUA in March and August 2008 and October 2009 along the expanse of the alluvial and the limestone formation in the area. The 2008 and 2009 surveys covered Bgys. Concepcion, Carpenter Hills, Morales, Paraiso, San Isidro, Sta. Cruz, Sarabia and Bgys. San Jose and Topland.

40. The survey identified three electrostratigraphic layers in the study area: the conductive layer with resistivity less than 20 ohm-meters; the resistive layer with resistivity ranging from 25 to around 150 ohm-meters; and the highly resistive layer with resistivity greater than 200 ohm-meters. The conductive layer is associated with formation consisting predominantly of fine-grained sediments such as clay and silt and limestone formation with significant amount of clayey and marlyfacies. The resistive layer is associated with formation consisting of coarse-grained sediments such as sand and gravel and limestone formation containing significant amount of coarse sediments and clasticfacies. This layer represents the aquifer in the study area and could be intersected down to depths ranging from 50 to 120 meters below ground level (mbgl). In some sounding points, this layer extends down to undetermined depth but is believed to reach depths greater than 120 mbgl. The highly resistive layer is associated with the massive sandstone and limestone formation.

41. The geological and geophysical investigation as well as the lithostratigraphic well logs suggests that an aquifer exists both in the limestone formation and the alluvial deposits. These aquifers are believed to have sufficient recharge and have substantial groundwater storage that could be exploited to support the water requirement of the existing and proposed service areas. Based on the results of the previous well drilling projects in Koronadal, the aquifer in the study area exhibits transmissivity ranging from $1.85x10^{-3}$ to $5.36x10^{-3}$ m^2/s and could support wells with capacities ranging from 30 to 50 lps.

42. **Climate.** The City of Koronadal has a mild and sub-tropical climate and typhoon free. Rainy months are from June to October. Based on the climatic data of the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) the highest rainfall is 225.60 mm in August 2003, and the lowest rainfall is 3.0 mm in April 2003. Its highest relative humidity ranged from 82% to 84% in the months of June to October during 2001 to 2006. The month of April 2006 has the lowest relative humidity of 74%. Warmest temperatures occur during the month of April. Maximum temperature was observed at 35.20^0C in March 2004, while the coolest was observed at 22.10^0C in November 2003.

43. Analysis made by PAGASA of the trends of increases or decreases in extreme daily rainfall are not statistically significant; although, there have been changes in extreme rain events in certain areas in the Philippines. For instance, intensity of extreme daily rainfall is already being experienced in most parts of the country, but not statistically significant. Likewise, the frequency has exhibited an increasing trend, also, not statistically significant. On the other hand, analysis of extreme daily maximum and minimum temperatures (hot-days index and cold-nights index, respectively) show there are statistically significant increasing number of hot days but decreasing number of cool nights.[3]

44. PAGASA predicted that the mean temperature in South Cotabato would increase by an average of 1.1^oC in 2020 and by an average of 2.15^oC in 2050. On the other hand, rainfall would increase by 10.1% during the months of December to March and decrease by an average of 9.2% from April to November in 2020, increase by 8.6% in December to March and decrease by an average of 14.4% in 2050.[4]

45. **Air Quality and noise.** There are no available air quality data specific to the areas where the subproject components will be constructed. However, based on the consultant's experience on air quality measurements of similar rural setting in the Philippines, the expected average ground level concentrations of total suspended particulates (TSP) would be close to the indicative value of 65 ug/Ncm. Similarly, there are no actual data on the present noise levels of this area. Again, based on the consultant's experience on noise measurements of similar rural setting in the Philippines, the expected noise levels along the inhabited areas would be between 42 to 48 dB(A) for the daytime, while those in the farm areas would be less than 40 dB(A). In areas where there is higher vehicular traffic volume noise levels could reach as high as 54 dB(A).

C. Economic Development in the City of Koronadal

46. **City Income and Expenditures.** The City of Koronadal is a 3rd class component city with a total income of PHP 546,163,411.08 and expenditure of PHP 447,810,779.74 in 2011[5] Its income is derived from tax revenue, non-tax revenue, service income, business income and other income.

47. **Land Use.** The existing total urban land area of the city is 2,912 hectares or 10.51% of 27,700 hectares of Koronadal's land area.[6] The urban center of the city

[3] *Current Climate and Observed Trends*. kidlat.pagasa.dost.org.ph. Accessed on May 1, 2013.
[4] *Climate Projections*. kidlat.pagasa.dost.org.ph. Accessed on May 1, 2013
[5] State of Local Governance Report (2011). City of Koronadal
[66] http://koronadal.gov.ph. Accessed February 2014

includes the four Zones, Brgys. Morales, General P. Santos, Sta. Cruz, and a portion of Brgy. Sto. Nino, Conception and Paraiso.

48. **Commerce and Trade.** As the administrative center of Region XII, Koronadal has become important hub of commercial, industrial and other socio-economic activities. The City enjoys the distinction of being identified as the Agri-Industrial Center of the province of South Cotabato which made it as a lead center for industrialization acting as catalyst for development particularly in the second district of South Cotabato. Koronadal, primarily an agri-production area, boasts of an agri-based resources. Stable peace and order condition provides a favorable climate for more investments.[7]

49. **Agriculture.** Agricultural land accounts for about 55 % (15,225 hectares) of the total land area. Major crops include rice, corn, and high value commercial crops such as fruits , root crops, vegetable, legumes, and cutflowers are being cultivated. Rice and corn crops are in both irrigated and non-irrigated areas. Other agricultural endeavors include aqua culture/farming, livestock and poultry. The City is also extending agricultural facilities and other related services.

50. **Tourism.** Tourist attractions are either natural or man-made. Potential natural tourist destinations are the Millenium Falls in Barangay Cacub, the Cadidang Cave and the Cabillion and Supon Falls in Barangay San Jose, and the Siok Falls in Bgy. Mabini. There are five resorts. Tourist accommodations are available in the City such as economical dormitories, pension houses, and hotels. Koronodal City is a gateway to Lake Sebu - a place far from the city and inhabited by indigenous people.

51. **Existing Water Supply System**. Present water sources of CKWD are eight deepwells: Barangays Sto. Niño, GPS, Morales, San Antonio (Phase 1), San Isidro, Paraiso, and two in Sta. Cruz with discharges ranging from 2.5 lps to 26.10 lps. Water from the seven deepwells are pumped directly to the distribution system, while that of the San Antonio Well is transmitted to the existing elevated steel tank before releasing to the distribution network. Except for the newly constructed Sta. Cruz Well, water from all wells has manganese content exceeding the 2007 PNSDW limit of 0.4 mg/l. Iron and manganese removal facilities of the Sto. Niño, GPS and Morales pump stations are unable to reduce the manganese concentrations to acceptable levels. A 24-hr water service is not available in some areas.

52. CKWD has a total length of 81,045 linear meters (lm) of PVC transmission and distribution mains with pipe diameters ranging from 50 mm to 250 mm. Storage facilities are (i) one concrete ground reservoir constructed in 1998 and is located at Barangay Zone IV has a capacity of 800 cubic meters (m^3) and elevation of 84 meters above sea level (masl) , and (ii)one elevated steel tank located at Barangay Sta. Cruz and operates on a fill and draw scheme with water coming from the San Antonio Well. The San Antonio Well and the elevated steel tank are used exclusively for the residents of San Antonio Village.

53. **Existing Water Supply Service.** CKWD operates a water supply system serving an estimated 37,382 people with a total of 5,751 active connections as of May 2009 in the City of Koronadal covering 9 barangays, namely: Caloocan, General Paulino Santos, Morales, Sta. Cruz, Santo Nino, Zone I, Zone II, Zone III and Zone IV.

[7] http://www.nscb.gov.ph/ru12/Municipal Profile/Koronadal. Accessed February 2014

54. Data on present water service situation in the City of Koronadal were generated by a WDDSP household survey using stratified random sampling with 384 respondents. Survey was conducted on groups with pipe water connection and those without. For those with pipe water connection, the survey indicated low service coverage even in urban barangays. About 18.3% of respondents had piped water with the CKWD. Water supply service is intermittent in certain areas. Average monthly water consumption was 26.7 m^3. About 13.9% provided water to neighbors or relatives.

55. Issues on sufficiency and perceived quality of water were indicated for certain areas; additional sources were cited as private deep wells for other domestic uses (with an average volume of 1.2 gallons per day); purified water refilling stations were the source of drinking water for 2.4% with an average volume of 2.4 gallons per day and at an average cost of PhP16 per day; though not allowed, 1.4% used pump to increase water pressure. Overall, 81.9% assessed that water received from piped connection was sufficient for their needs.

56. When asked to rate water service, water pressure was considered poor by only 1.4% of respondents. All WD-connected respondents cited that water was available everyday during the rainy season. Performance rating on continuity of water supply was considered poor by 1.4%; on reliability of water – very poor by 1.4%; regularity of billing and collection was satisfactory with none giving a rating of “poor”, while response to customer complaints was rated poor by 5.6% and very poor by 2.8%.

57. There was positive net satisfaction of overall water service with 42% that reported some area of dissatisfaction. Aspects of water service that bothered households most were price and water quality. Areas for improvement were: water pressure (2.8%), reduction of water rates (20.8%), complaints handling (11.1%), quality of water (15.9%) and billing and maintenance at less than 5%. Aspects of water quality that were at issue were taste (21.7%), color (24.6%) and smell (8.7%).

58. For those without pipe water connection, 18.4% got water from water vendors and peddlers, while 3.4% reported paying for supply of piped water from those with water service connection. Most common water source was private shallow wells at 40.6% and private deep wells at 30.9%; less common were public faucets at 3.8%, while 0.3% got water from open dug wells.

59. Shallow wells led as a source for bathing (82.2%) and for gardening (83.4%) but only 45.7% used water from these for drinking. The main reason for not being connected as cited by 67.1% was unavailability of water connection; smaller percentages of 9% considered the application fee of P1,800 to be too high or that their present water source was satisfactory (11.2%). About 71.4% of non-connected households assessed overall quality of water from current source as extremely or moderately satisfactory all year round.

60. **Transportation and Communication.** The city can be reached by land, sea and air. Sea and air transportations are through Gen. Santos City where the port and airport are located. Land transportation has several routes plying to and from the city daily. Land transportation can be availed of through passenger buses, jeepneys, and vans. Within the city, one can take tricycles, jeepneys, multicabs and motorcycle (locally called habal-habal or skylabs) for remote barangays. Available communication facilities include

broadcast media (radio), television networks, telephone system, cell phone communications, internets, and publications (local and national dailies).

61. **Power Supply.** Electricity comes from the Mindanao Grid of the Maria Cristina Hydro Electric Plant in Lanao del Norte. It is distributed in the city by the South Cotabato I Electric Cooperative, Inc. (SOCOTECO-1). All 27 barangays are energized.

D. Socio and Cultural Resources

62. **Population and CKWD Service Area.** Based on 2010 Census of Population and Housing (NSO), City of Koronadal 2010 population was 158,273. Population density was 5.7 persons per hectare. Rural population was 99,330 representing 62.76% of the total population, while urban population was 58,943 equivalent to 37.24% of the total population. The existing service area of CKWD covers 9 barangays namely Caloocan, General Paulino Santos, Morales, Sta. Cruz, Sto. Nino, Zone I, Zone II, Zone III and Zone IV. The existing service area will eventually be expanded to include 2 more barangays under the LWUA-funded project. Three more barangays will also be included under a WDDSP and these are Concepcion, Namnama, and Sarabia. By design year 2025, the service area would cover 14 barangays out of the 27 barangays of the city.

63. **Public Health and Sanitation.** The City of Koronadal plays an active role in the creation of the Local Area Health Development Zone (LAHDZ), a district or a catchment area composed of a number of neighboring municipalities which main function is to improve networking and strengthen cooperation among themselves with regards to health matters. Its mission is to provide quality, efficient and effective healthcare through: (i) provision of entire package of services for its entire populace, (ii) intensification of information, education activities on the basic health services, (iii) provision of adequate health facilities, and (iv) strengthening of personnel/ community involvement. The available data on morbidity from the City Health Office ranked diarrhea as second in the 2006 ten leading causes of morbidity.

64. City of Koronadal has five hospitals of which one is a tertiary hospital. There are 28 private medical clinics, 8 dental clinics, and 38 health centers. The NSO 2000 sanitation data revealed that only 45.2% of total households had septic tanks. Presently, the city has no sanitary sewer system.

65. **Education.** Six private institutions provide tertiary level education, while technical/vocational education is available from 11 private schools. High school education is offered by 15 government and privately operated schools. Based on the 2006 data of the Department of Education, the city had a literacy rate of 95.44%.

66. **Socioeconomic Survey.** WDDSP conducted a household survey to get a good insight into the socioeconomic situation specific to the project area. Using stratified random sampling, 384 respondents were interviewed for a 95% level of confidence and standard deviation of 0.1. Based on this survey, average household size is 5.34 with 36.1% having 3-4 members and another 33.6 having 5 members. Women-headed household is 18.6%. Highest grade of household heads was college and over with a significant difference of 65.7% for WD connected households as against 34.5% for non-connected households. Other respondents reached or finished high school. Respondents were distributed under a wide occupational range including farming, business, street vending, and government and private employment; 4.3% of non-

connected households were unemployed. Ilonggo (68%) was the most spoken language in the area followed by Cebuano (10.5%) and Ilocano (9.5%). Sole occupancy of dwelling was most common at 85.5% with 58.8% owning the house they occupied.

67. Average monthly income was PhP10,762, though 22.9% had incomes of less than P5,000 and another 35.2% had an income range of PhP5,000 – PhP9,999. The official annual per capita poverty threshold for South Cotabato for 2012 was pegged at P 19,847.[8] About 22% spent less than P5,000 per month while a sizable percentage (42.4%) spent about P5,000 – P9,999. Over 58% were unable to save while many of those who could (28.1%) had less than P1,000 in savings per month. Television (88.5%), cellular phones (88%) and refrigerators (61%) were the most common valuable items of the household.

68. Out of the 393 households in the City of Koronadal, 79.6% had water-sealed toilet (flush or pour flush) connected to a septic tank. The next most common type of toilet system representing 9.2% of the households was water-sealed toilet (flush or pour flush) connected to a pit; 8.9% shared toilets. All households in the survey sample had toilets though 0.5% admitted using water-sealed flush or pour flush toilets that connected to the drainage system. All of 80% were satisfied with their current toilet system; the main reason for dissatisfaction was due to a combination of backflow resulting to foul odor and inconvenience (61.8%). Some 27.7% of Koronadal households felt a need to improve their septage system; 43.1% of these preferred to improve their existing septic tanks.

69. All survey respondents reported washing hands before cooking, before eating, after using the toilet, before feeding children, and after washing the children after toilet. There was less awareness about washing hands before breastfeeding (51.9%). Non-connected households transported water from source using open (53.3%) and closed containers (19%) or a combination of both open and closed containers (17.1%). Some also used pipe or water hose to connect to a neighbor as reported by 5.7% of 315 cases; 4.1% of 319 cases had at least one member who suffered from a water-related disease during the past year while 0.6% of households had at least one child who suffered from diarrhea, About 6.9% of non-connected households treated water from the faucet before drinking. Respondents sought medical services primarily from public facilities such as medical centers (55%), government hospitals (16.8%), private hospitals (7.4%) and private clinics (15.3%). The majority (91.3%) of respondents were satisfied with available health services in their locality, with men slightly more satisfied than women; 73.3% of both female and male-headed households had access to Philhealth or had assistance on health expenses; 2.5% relied on self-medication.

E. Socioeconomic Conditions in Brgy. Paraiso

70. **Demography.** Brgy. Paraiso has a population of 5,642 comprising of 1,240 households with 1,514 families. It has a total land area of 2,334 ha subdivided into 10 puroks and one sitio. Sitio Salkan, the biggest sub-village, is a community of indigenous people, mostly B'laans comprises 19% of the barangay population, while Purok Paglaum is the smallest in terms of population contributing about 6% to the population. [9]

[8] http://www.nscb.gov.ph/poverty. Accessed February 2014
[9] Barangay Profile. Brgy. Paraiso, City of Koronadal. 2012.

71. The dominant tribes found in the barangay are Ilonggo (76%), B'laan (13.9%), Tagalog (3.9), and Bisaya/Cebuano, (1.2%). Ilonggo has the highest number because the founder of the barangay came from Iloilo.

72. **Social and cultural characteristics.** There are various religious denominations in the barangay with the Roman Catholic being the biggest group followed by the Baptist, and Iglesia ni Cristo as the third in rank. Any archeological, historical, or cultural chance finds will be reported to the National Museum of the Philippines and the works suspended.

73. There are five day care centers operating in the barangay jointly funded by the city and the barangay, and two elementary schools operated by the Department of Education.

74. There is no known historical or archeological site of significance in the barangay.

75. **Agricultural crops.** Brgy. Paraiso is basically an agricultural area. Majority of the people depend on farming as source of income to provide for the basic needs of the family. Tilling of lands for crops and vegetable plantation are commonly practiced. Major crops raised by farmers are corn, rice, and minor crops are vegetables and fruit trees, such as mangoes and bananas. **Table 6** presents the major and minor crops in Brgy. Paraiso.

Table 6: Major and Minor Crops in Brgy. Paraiso
(2002)

Major Crops	Area (ha.)	Production (per ha.)
Rice	144.4	100 sacks at 50 kg/sack
Coconut	36.1	4 tons
Corn	577.5	150 sacks with cobs
Fruit trees	18	7 tons
Vegetables	5	1 ton

Source: Barangay Development Plan 2003-2007, Brgy. Paraiso.

76. **Livestock.** Livestock raising on small scale is also practiced in the barangay to augment family income. Normally, raising of livestock is on backyard level, usually chicken. **Table 7** shows the inventory of livestock in Brgy. Paraiso.

Table 7: Inventory of Livestock
(2002)

Livestock	Number
Pig	1,000
Chicken	5,000
Goat	500
Carabao	1,000
Cattle	1,500

Source: Barangay Development Plan 2003-2007, Brgy. Paraiso.

F. Commerce and Trade

77. **Commercial establishments.** The most common business establishments in the barangay are sari-sari stores and carenderia or small restaurants. As of 2002, there were 45 sari-sari stores selling basic commodities and only one carenderia.

78. **Employment.** Sari-sari stores are the most common economic activity to augment family income. Employment in public or private establishment remains slim within the barangay because of very limited employment opportunities.

G. Infrastructure Facilities and Utilities

79. Due to the close proximity of Brgy. Paraiso to the city proper, provision of infrastructure facilities and utilities like communication, electricity, and road networks is assured but on a limited scale. **Water.** Limited supply of potable water is a concern on Brgy. Paraiso. Domestic water supply is usually provided by either shallow wells in individual residential units or by communal shallow wells. The prevalent rate of water borne diseases would continuously affect the health of the residents. Some households have their own shallow wells but the majority depends on communal system which is also limited.

80. **Electricity.** Electricity is supplied by the electric cooperative, South Cotobato 1 Electric Cooperative, Inc. (SOCOTECO 1) which operates four substations (Matulas,Koronadal; Morales Koronadal; Dajay Surallah; and Poblacion Norala). Not all barangays are served and expansion of the electrification program is needed.

81. **Transportation.** The concrete national highway connects the barangay with the rest of the city and the nearby municipalities. The barangay is accessible to all forms of land transportation facilities, such as buses, jeepneys, vans, multi-cabs, motorcycles (skylab), and private vehicles.

Communication. The major form of communication is via mobile and landline telephone system provided by the major telecommunication companies

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

82. The present report assesses the impacts of the proposed activities on various environmental attributes of the subproject site.

83. **Methodology.** Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed project; (iii) site visit and professional assessment by the environment specialist; and (iv) evaluation of proposed design and potential impacts based on the environment specialist's past experiences. Categorization of the project and formulation of mitigation measures have been guided by ADB's REA Checklist for Sewage Treatment (**Appendix A**) and ADB SPS 2009.

84. A comprehensive assessment of environmental impacts is made through a review of the parameters associated with septage management against the components of the proposed CKWD subproject and the environment where the facilities will be located. A screening checklist was developed from various sources such as DENR

checklists and ADB's REA Checklist. Some items of the checklist may not be applicable to this particular subproject. However, they are included in the discussions to indicate that their applicability was reviewed in the environmental impact screening process. This will help identify which topics do not require further attention.

A. Anticipated Impacts of the Subproject

85. The assessment is made on the following phases of the subproject: (i) pre-construction, (ii) construction, and (iii) operation and maintenance. Results of the environmental impacts screening are summarized in **Table 8,** covering the three phases of project development.

86. **Pre-construction.** Planning principles and design considerations will be incorporated in the site planning process whenever possible. The concepts considered in the design of the SpTF are: (i) efficiency of treatment, (ii) protection of the water quality of the receiving waters, (iii) community health and safety, (iv) no involuntary land acquisition, (v) ecological resources, and (vi) solid wastes.

87. Before the design is prepared, waste characterization will be conducted to determine the quantity and quality of the septage to be treated in the SpTF. Likewise, the water quality characteristics of the receiving body of water and groundwater will be determined as part of the baseline data.

88. In addition, the design shall take into consideration the potential vulnerability of the subproject's structure to natural hazards such as earthquake and extreme rainfall events. As such, the appropriate studies will be undertaken during DED for such hazards, and the corresponding structural measures and standards will be incorporated in the final design.

89. Likewise, relevant engineering standards shall be applied to account for other natural hazards (e.g., flood, earthquake). All civil works will take into consideration construction criteria applicable to the observed level of risk. Disaster risk mitigation measures will include, among others, sufficient elevation for structural foundation to account for projected or estimated flood depths; avoiding areas of known seismic risks (e.g., fault lines) as component locations; and ensuring structural design are in accordance with applicable standards/codes. These measures will be considered in detail during the DED stage.

90. Using the AWARE climate sensitivity software and the scenario of "without-mitigation", the project has been rated as "MEDIUM" risk with flood and landslide as major risk contributors. With all the identified mitigation and adaptation measures for both climate change and natural hazards, the resulting residual risk significance may be considered as "LOW".

91. It is expected that some problems may be encountered during the initial stage of implementation because it would be the first time that septage collection, transport, and treatment would be done in the city. It is therefore essential that the proposed septage management ordinance be promulgated and enforced. An information campaign must precede any construction activity in order to make the public aware of the extent of the problem that might be present during the periods of construction and operation.

92. **Construction.** Construction of the SpTF will be contracted to qualified contractors who provide the equipment and manpower. Contractors will supply materials and labor. Bid documents will include the requirements for incorporating pertinent provisions of the environmental management plan to be carried out by the contractors during construction.

93. Construction will be undertaken by contractors under the supervision of CKWD engineers to ensure that the terms and conditions of the contract are followed. During test runs, influent and effluent qualities will be analyzed to determine the actual efficiency of the treatment system. This is in addition to other conventional performance tests, such as leak (hydraulic) testing, etc. to test the integrity of the structures.

94. Under the Cultural Properties Preservation Act (Presidential Decree No. 374) when excavators shall strike upon any buried cultural property, the excavation shall be suspended and the matter reported immediately to the Director of the National Museum who shall take the appropriate steps to have the discovery investigated and to ensure the proper and safe removal thereof, with the knowledge and consent of the owner. The suspension can only be lifted by the Director of the National Museum.. Accordingly, in case of archeological, historical, cultural chance finds, the following procedure would be observed to avoid damage to cultural properties: (i) detailed design of all civil works will be located away from all cultural/ archeological/historical properties; (ii) procedures for chance finds of valued relics and cultural values will be stipulated in the contract with contractors in order to avoid damaging such valuable properties; (iii) site supervisors will be on the watch for chance finds; (iii) upon a chance find, all work will be stopped immediately, find will be left untouched, notify CKWD who in turn will notify the National Museum; (iv) work at the find site will remain suspended until the National Museum allows work to resume.

95. **Operation and maintenance.** CKWD workers will undertake the operation and maintenance (O&M) of the SpTF after undergoing training. One of the main O&M activities of the SpTF will be the monitoring of the treated effluent quality to ensure compliance with the prescribed effluent standards. Simple process control such as settleability test, pH reading and other basic monitoring procedures will be part of the O&M to be conducted by the facility operators to ensure that the desired quality of the treated effluent is attained at all times.

96. Other O&M activities include the periodic cleaning of the receiving screen basket at the grit chamber so that it will be free of any obstruction. Periodic cleaning of the ponds will also be done to prevent weeds from growing in the ponds. Transfer of sludge into the sludge drying bed using sludge pumps will also be done on regular basis to maintain the effective operating depths of the ponds in order to avoid emission of foul odor. The operator will also do periodic harvest of the dried sludge from the sludge drying bed to be used as soil conditioner for nearby farms.

97. Depending on their magnitude, earthquakes can produce faults in rocks, in the subsoil, settlement of the ground surface, cave-ins, landslides, and mudslides. Vibration can also soften saturated soils (known as liquefaction), reducing the capacity of structural resistance.

98. Sudden heavy downpour can overwhelm existing drainage infrastructure and increase erosion.

99. **Decommissioning.** Due to the relatively long operational life of the subproject, decommissioning or closure is not envisioned in the near or medium term (e.g., 25 – 50 years). In case decommissioning become an option, the appropriate action plan will be prepared in compliance with GOP regulatory requirements.

Table 8: Anticipated Impacts of the Subproject

Impact Field	Anticipated Impact on the Environment
Design Phase	
Effluent standards	The SpTF must be designed to meet the prescribed effluent standards specified in DENR DAO 35, series of 1992 (**Appendix B).**
Construction work camps, concrete mixing plants, stockpile areas, storage areas, and disposal areas	Locations may cause encroachment/impact either directly or indirectly on adjacent environments. It may also include the impacts on the people who might lose their homes or livelihoods due to the project activities.
Traffic	Traffic flow will be disrupted if routes for delivery of construction materials during construction activities are not planned and coordinated with local authorities.
Construction Phase	
Sources of materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.
Air quality	Emissions from construction vehicles, equipment, and machinery used for excavation and construction resulting to dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons.
Surface water quality	Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate downstream surface water quality.
Noise levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people. Operation of heavy equipment and machines in the night time can cause nuisance to the surrounding environment/ people
Ecological resources	Cutting of trees may affect terrestrial ecological balance and affect terrestrial and aquatic fauna/wildlife.
Landscape and aesthetics	Solid wastes as well as excess construction materials create unacceptable aesthetic condition.
Accessibility	Traffic problems and conflicts in right of way.
Occupational health and safety	Occupational hazards which can arise during construction (e.g., falling objects).
Community health and safety	Community hazards which can arise during construction (e.g., air quality, noise, falling objects, etc.). Traffic accidents and vehicle collision with pedestrians during material transport.
Construction waste	Accumulation of debris waste materials and stockpiling can cause environmental visual pollution.
Temporary work camps	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. This may cause conflict with residents and problem of waste disposal and disruptions to residents.
Social and cultural resources	Risk of archaeological chance finds. Sites of social/cultural importance (schools, hospitals, religious place, tourism sites) may be disturbed by noise, dust, vibration, and impeded access.

Impact Field	Anticipated Impact on the Environment
Clean-up operations, restoration and rehabilitation	Impacts on social or sensitive receptors when post construction requirements are not undertaken, e.g. proper closure of camp, disposal of solid waste, and restoration of land after project construction.
Operation and Maintenance Phase	
General maintenance	Operation and maintenance activities may cause disturbance to sensitive receptors, dusts, and increase in noise level.
Air quality	Sensitive receptors (e.g. hospitals, schools, churches) may be affected temporarily by increased traffic and related impacts during collection and hauling of septage to the SpTF.
Community health and safety	Desludging of septic tanks and transport of septage may cause health risks if spilled along the truck route. Traffic and noise nuisance may also occur.
Biodiversity fauna and flora	The proposed site is in a rolling terrain. No areas of ecological diversity occur within the project location. Due to the nature and locality of the project there is unlikely to any significant impacts on biodiversity within the area during maintenance works.
Degradation of water quality of receiving body of water during malfunction of the facility	Water quality of the receiving body of water may be adversely affected during malfunction of the facility. However, since the site will be beside the sanitary landfill of the city, the partially treated wastewater can be temporarily diverted to the landfill while repair and maintenance is undertaken.
Health and safety	Danger of operations and maintenance-related injuries. Safety of workers and general public must be ensured.
Noise and Vibrations	Sensitive receptors (hospitals, schools, churches) may be affected temporarily by increased traffic and related impacts. Disturbance from afterhours work.
Solid Waste	Solid waste residuals which may be generated by the SPTF such as sludge cake may pose aesthetic problem when it accumulates in the site.
Wastewater	Treated effluent will be discharged into the receiving body of water. All discharge must meet government prescribed effluent standards (**Table 5)**.
Bio-aerosols	Bio-aerosols (i.e., particles in the air consisting wholly or partially of microorganisms) are of particular concern to the health of workers and surrounding communities and have been shown to be the source of reduced pulmonary function and increased respiratory disease for those in immediate proximity of SpTF.
Air emissions and odors	Air emissions from wastewater treatment operations may include hydrogen sulfide, methane, volatile organic compounds, gaseous or volatile chemicals used for disinfection processes (e.g., chlorine), and bio-aerosols. Odors from treatment facilities can also be a nuisance to workers and the surrounding community.
Climate change	Warmer temperatures may reduce treatment efficiency if critical thresholds are exceeded, e.g., decrease in dissolved oxygen, potentially leading to hypoxia, toxic algae growth in waste stabilization ponds.
Natural risks such as earthquake and flood	Damage to structures and potential overflow of ponds during sudden heavy downpour.

Source: PPTA Consultant.

B. Mitigation Measures

100. The subproject is unlikely to cause significant adverse impacts. There are no impacts that are significant or complex in nature, or that needs an in-depth study to assess the impact. The potential adverse impacts that are associated with design,

construction, and O&M can be mitigated to acceptable levels with the mitigation measures presented in **Table 9.**

Table 9: Recommended Mitigation Measures

Parameter	Mitigation Measures
Planning Phase	
Protection of water quality of receiving body of water on and groundwater	• Waste characterization of the septage to be treated and the prescribed effluent standards will be determined to be used as bases for the design of the SpTF. • Design the efficiency of the treatment system to meet the prescribed standards. • Undertake baseline water quality tests of the receiving body of water and groundwater in the project site to serve as benchmark for subsequent monitoring.
Hauling of construction materials	• Ensure careful planning and scheduling of the activities. • To minimize impact on traffic flow and road users, as much as possible hauling of construction materials to be done at night. • Consider low-traffic and non-sensitive areas (other than schools, religious places, and commercial/business) for daytime transport. • Prepare a traffic management plan and road safety plan.
Barricades and warning signs	• Use easily transportable barricades and warning signs such as those made of high reflector plastic materials. • Also use aluminized rolled warning signs to warn the public of the possible high vehicular traffic along the transport route of construction materials.
Reuse of excavated materials	• Excavated materials can be used to as filling materials for depressed areas of the property.
Workers	• Employ workers with adequate experience, training, and know-how. It is always advantageous for the contractor to employ workers with adequate experience, training, and know-how in the line of work that they are doing. These people are usually reliable and can be counted upon to exercise good judgment in the field.
Community and public awareness	• Establish extensive coordination with the barangay and other government agencies, as may be needed. • An information campaign must precede any construction activity in order to make the public aware of the extent of the problem that might be present during the period of construction and operation of the facility. • Open liaison channels shall be established between the barangay, the contractors, and interested and affected parties such that any queries, complaints, or suggestions can be dealt with quickly and by the appropriate persons.
Surveys	• Land survey with objective to conduct control level survey, and control traverse survey for the design.
Legislation, permits, and agreements	• In all instances, CKWD and contractors must remain in compliance with relevant local and national legislations.
Access to site	• Access to site will be via existing roads and acquired right of way. The contractor will need to ascertain the existing condition of the roads and repair damage due to construction. • The local traffic police shall be involved in the planning stages of the route of construction materials. • The local traffic police must be informed at least a week in advance if the traffic in the area will be affected. • No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the EMB-Regional Office.
Setting up of temporary construction facilities	• Choice of site for the facilities must take into account location of local residents, businesses, and existing land uses, including flood zones and slip/unstable zones. • If the contractor chooses to locate the camp site on private land, he must get prior permission from the landowner. • Use portable toilet facilities (PORTALETS). Under no circumstances may open areas or surrounding bushes be used as toilet facility. • Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged.
Establishing equipment lay-down and storage area	• Storage areas shall be secure so as to minimize the risk of crime. They shall also be safe from access by children, animals, etc.

Parameter	Mitigation Measures
Materials management – sourcing	• The contractor shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, etc), and submit these to CKWD for approval prior to commencement of any work.
Education of site staff on general and environmental conduct	• Ensure that all site personnel have a basic level of environmental awareness. • Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task.
Construction phase	
Excavations	• The excavated earth shall always be dumped on the designated areas to be reused as needed. • In the event that excavations are to be kept open overnight, lights, high visibility warning signs, and barricades shall be provided.
Hauling of excavated materials	• The contractor shall haul away all excavated materials from the excavation site and deposit these in an area designated by CKWD. • The stockpile shall be processed where it is deposited so that it can be brought back to the site as filling material.
Reuse of excavated materials	• The contractor can process the excavated materials at the disposal site and use these as selected backfill materials. • If excavated materials are not suitable for reuse, the contractor shall deposit these in an area designated by CKWD.
Equipment	• The contractor shall use mechanical excavators in appropriate areas to fast tract the construction.
Occupational health and safety	• Employ workers with adequate experience, training, and know-how. • These workers shall be led by an experienced supervisor or engineer, who will provide the leadership in daily activities. • A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. • The contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. • Proper personal protection equipment, such as hard hats and safety shoes shall be used in construction site.
Community health and safety	• Contractor's activities and movement of staff will be restricted to designated construction areas. • The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site. • The contractor will ensure that any damage to properties and utilities will be restored or compensated to pre-work conditions. • The site must be kept clean. • Machinery and vehicles are to be kept in good working order for the duration of the subproject to minimize noise nuisance to neighbors. • Noisy activities must be restricted to the times given in the project specification or general conditions of contract. • A complaints register (refer to the grievance redressal mechanism) shall be housed at the site. This register is to be tabled during monthly site meetings. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. • The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the concerned personnel attention immediately; and (iv) taking remedial action. • The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken within 48 hours of receipt of such complaint/grievance.

Parameter	Mitigation Measures
Community and public awareness	• Storage facilities and other temporary structures on-site shall be located such that they have as little visual impact on local residents as possible.
Temporary construction facilities and storage areas	• The contractor is to ensure that open areas or the surrounding bushes are not being used as a toilet facility. • The contractor shall ensure that all litter is collected from the work areas daily. • Bins shall be emptied regularly and waste shall be disposed of at the pre-approved site. • The contractor shall ensure that his camp and working areas are kept clean and tidy at all times. • After construction work, all structures comprising the construction camp should be removed from site or handed over to the property owner/community as per mutual agreement (if established on private/community land). • The area that previously housed the temporary construction facilities is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. • The contractor must arrange the cancellation of all temporary services.
Dust and air pollution	• Vehicles travelling to and from the construction site must adhere to speed limits to avoid producing excessive dust. • Access and other cleared surfaces must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust. • Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption, and emission.
Noise levels	• Noise-generating equipment must be fitted with silencers. • If a worker is exposed to noise above a noise exposure limit, the contractor must investigate options for engineered noise control such as using low-noise excavators, jackhammers, drills, and power generators. • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection.
Water quality	• Every effort shall be made to ensure that any chemicals or hazardous substances do not contaminate the soil or water on-site. • Care must be taken to ensure that runoff from vehicle or plant washing does not enter the surface/ground water. • Site staff shall not be permitted to use any stream, river, other open water body, or natural water source adjacent to or within the designated site for the for disposing wastes. • All concrete mixing must take place on a designated, impermeable surface. • No vehicles transporting concrete to the site may be washed on-site. • No vehicles transporting, placing, or compacting asphalt or any other bituminous product may be washed on-site. • All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed or removed from the site. • Hazardous substance/ materials are to be transported in sealed containers or bags.
Waste management	• Wastes must be placed in the designated bins which must be regularly emptied. These shall remain within demarcated areas and shall be designed to prevent wastes from being blown out by wind. • Littering on-site is forbidden and the site shall be cleared of litter at the end of each working day/night period. • Recycling is to be encouraged by providing separate receptacles for different types of wastes and making sure that staff is aware of their use. • All waste must be removed from the site and transported to a disposal site. • Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the environment management specialist, or at disposal sites.
Conservation of natural environment	• Only trees that are covered by Permit to Cut can be removed, if cutting of trees is required.
Cultural and historical environment	• If something of archeological importance is uncovered, the National Museum or the DENR shall be contacted and work shall be stopped immediately.
Safeguards supervisor or pollution control officer	• The contractor shall appoint one environment safeguard supervisor or pollution control officer who will be responsible for assisting the contractor in implementation of EMP, coordinating with the EMB-RO, community liaison, consultations with interested/affected parties, reporting, and grievance redressal on a day-to-day basis.
Operation and Maintenance Phase	

Parameter	Mitigation Measures
Treatment efficiency	• Procedure for each step of operation shall be documented and all workers/operators shall be trained on the proper opertion of each component of the SpTF, including the proper deslidging procedure for steptic tanks. • Although impact is likely to be minimal due to new and well-designed efficient system, it must be ensured that the facility is operating properly at all times.
Discharge of treated effluent	• Quality of discharge shall be regularly monitored to ensure that effluent quality complies with the prescribed effluent standards. During malfunctioning, effluent shall be diverted to the sanitary landfill.
Solid waste	• Dried sludge from the drying bed (bio-solids) shall be used as soil conditioner in nearby farms.
Public awareness	• The LGU of the City of Koronadal and the CKWD shall work together in increasing public awareness in septage management to ensure full compliance and cooperation of the general public. School children shall also be target for IEC campaign. • CKWD and the city government will implement a septage management program jointly.
Potential decrease in treatment efficiency due to decrease in dissolved oxygen in ponds	• Appropriate measures to increase dissolved oxygen, such as cascades and mechanical aeration.
Damage due to natural risks, such as earthquake and flood	• Design and construction of the subproject shall conform to the criteria mandated by the Philippine Building Code and DPWH guidelines to ensure structural integrity. • Re-vegetation of steep slopes to prevent erosion.

CKWD=City of Koronadal Water District, DENR=Department of Environment and Natural Resources, EMB-RO=Environmental Management Bureau-Regional Office, EMP=Environmental Management Plan, LGU=Local Government Unit, IEC=Information, Education, and Communication, SpTF=Septage Treatment Facility.

Source: PPTA Consultant.

C. Cumulative Impact Assessment

101. The cumulative impact assessment (CIA) examined the interaction between the project's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project's potential cumulative effects were considered with respect to valued components (VCs) in environmental and socioeconomic categories, in four areas:

(i) of any potential residual project effects that may occur incrementally over time;

(ii) consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;

(iii) potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed project; and

(iv) future developments that are reasonably foreseeable and sufficiently certain to proceed.

102. The project has identified the VCs as water quality, noise, traffic management, socioeconomic and socio-community components, and human health. There are no foreseeable projects that will overlap with the project. The spatial boundary of the project is the area along the route of the vacuum truck carrying the septage, existing right of ways, and the SpTF. The temporal boundary can be considered as the whole City of Koronadal.

103. Cumulative effect of the effluent discharge from the SpTF will not be significant because of its small volume, compliant with the prescribed standards, and the presence of natural purification process and assimilative capacities of the receiving water body. This would prevail in spite of the presence of the sanitary landfill in the same vicinity.

104. Air quality effects will occur during construction. Consequently, although emissions of common air contaminants and fugitive dust may be elevated in proximity to active work sites, this impact will be short-term and localized to the immediate vicinity of the alignment. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, landfilling of residual wastes). Given the project's relatively minor contribution to common air contaminants and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible.

105. Noise levels during construction in the immediate proximity of most work sites are expected to increase. The duration of this exposure will be relatively brief. This exposure represents a temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the project O&M will be largely imperceptible, as the pump is submersible and located in relatively small sites within the barangay.

106. Land use/traffic management concerns will occur spatially during construction. Traffic movement along the route of the construction materials alignment will improve once construction is completed. Since the project will be located beside the city's sanitary landfill, it will not conflict with existing or planned land use.

107. Upon completion of the subproject, the socio-community will benefit from improved public health. This is considered a long-term cumulative benefit.

108. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and common air pollutants will occur in proximity to project work sites during construction, due to their short-term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health.

109. The subproject will benefit the general public by contributing to the long-term improvement of public health and community livability in the City of Koronadal.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Public Consultations Conducted

110. The public participation process included (i) identifying interested and affected parties (stakeholders); (ii) informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; (iii) creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regard to the proposed development; (iv) giving

the stakeholders feedback on process findings and recommendations; and (v) ensuring compliance to process requirements with regards to the environmental and related legislation.

111. The following methodologies have been used for carrying out public consultation:

(i) Public forums thorugh organized public consultations with residents of the barangays where the subproject will be established.

(ii) Walk-through informal group consultations were held in the Brgy. Hall of Brgy. Paraiso.

(iii) Additional and more intensive IEC campaign will be conducted by the city government during the Phase I of the subproject when the city ordinance on septage management is promulgated. Even duriing its formulation, public hearings will be conducted by the city council to get the feedback of the city contituents regarding the proposed ordinance.

112. CKWD has undertaken various activities concerning information disclosure, public consultation, and public participation for the proposed subprojects. These were done to achieve a meaningful stakeholders' consultation and ensure success. During the planning phase, information regarding the proposed subprojects were disclosed to the public such as in the conduct of a socio-economic survey between April to May 2009. Some 384 households in CKWD's area were informed about the proposed subproject and interviewed for socio-economic data. Survey respondents also included those households without water service connection with CKWD.

113. **Key informant interviews.** Key informant interviews and focus group discussions (FGDs) with *barangay* and city officials were conducted to get their cooperation and gather information relative to poverty incidence and concentration, and identify needs and recommendations on water. Participants in the key informant and FGDs included the (i) WD staff and management, (ii) local health officials, (iii) gender focal persons of LGU, (iv) city and *barangay* officials, (v) LGU planning offices, (vi) local environment offices, and (vii) urban poor NGOs.

114. **Public consultation.** On 18 August 2009, CKWD conducted an initial public consultation and formally discussed the proposed water supply subproject with the stakeholders and requested their views. Note that at this initial stage, septage management was a subproject component. A total of 9 stakeholders' representatives participated. Stakeholders were encouraged to raise their social and environmental issues. Participants included: (i) concerned individuals, (ii) barangay officials, (iii) NGOs, (iv) LGU planning officials, (v) City Environment and Natural Resources Officer, and (vi) WD staff and management. Stakeholders expressed support for the CKWD subprojects. Summary of the consultation outcomes is presented in **Table 10**, while the documentation is presented at the **Appendix B**.

Table 10: Summary of Comments and Responses in the Public Consultation Held on 18 August 2009

Group Represented / Representative	Issues/ Concerns Raised	Project's Response
City Health Office; 1	Incidence of waterborne	Proposed septage management

Group Represented / Representative	Issues/ Concerns Raised	Project's Response
attendee	diseases usually increased during rainy season.	program will greatly help the city in controlling the spread of septic tank effluents.
City Planning Office; 1 attendee	Reservations on the positive impact of the proposed septage management program since only 10% of the households have functioning septic tanks as estimated.	The project has a revolving fund for septic tanks repair and also studying the possibility of involving women's organizations in implementing the financing of septic tanks repair using the revolving fund. The projects suggested a joint CKWD-CHO information campaign to increase 'buy-in" to the septage management program and possible increase in the number of water service connections.
City Engineers Office; 2 attendee	Reservations on the viability of the septage management program if only 10% of the households can participate since it might result to a significant increase in water tariff to recover the cost for operation and maintenance.	Financing concerns are being analyzed under the PPTA and data on septic tanks will be validated during detailed engineering design phase.
LGU Representative; 1 attendee	The city will study CKWD's suggestion for the LGU to manage the proposed septage management system and requested detailed cost estimates of the proposed system to be used for City Council presentation.	Detailed cost estimates are not yet finalized.
Barangay Chairman of Concepcion; 1 attendee	Barangay Concepcion has poor quality groundwater and people are buying drinking water from water stations.	The project will definitely serve Barangay Concepcion since the pipeline will pass through this area.
Barangay Chairman of Concepcion	Ensure that public safety and convenience shall be addressed properly during pipelaying activities particularly near schools.	Civil works contracts will include provisions requiring the contractors to properly address public safety and convenience.
Barangay Chairmen of Saravia and Concepcion; 2 attendees	They expressed full support to the proposed water supply and sanitation subproject.	CKWD welcomed the expression of support.

115. Another public consultation on the proposed water supply systems in the selected five barangays and on the proposed septage treatment facilities was conducted in the CKWD Conference Room on 22 November 2012 to get the perception of the constituents on the proposed subproject. Twenty-seven attended the consultation, including barangay officials and residents of Brgys. Topland, Concepcion, Carpenter Hills, Saravia, GPS, Paraiso, Tampakan, and San Jose. Also present were a representative of the Unified Tricycle and Operators and Drivers Association and officials and staff of CKWD.

116. Participants in the public consultation held on November 22 were asked pre-formulated questioned to solicit their perception about the proposed subproject. All the participants expressed general acceptance of the proposed septage management program. **Table 11** presents the summary of the questions raised and the responses, while the complete documentation of the consultation is presented in **Appendix C.**

Table 11: Summary of Comments and Responses in the Public Consultation Held on 22 November 2012

Name / Organization	Question	Response
Hon. Samuel B. Velarde - Brgy. Captain, Brgy. Paraiso	When did you first learn about the proposed project and what were your initial reactions to it?	Brgy. Chairman Velarde said that it's his first time to learn about sanitation development and is glad that he was invited by CKWD for today's project proposal presentation.
Hon.David V. Mangisel -Brgy. Kagawad, Brgy. Concepcion	When did you first learn about the proposed project and what were your initial reactions to it?	Brgy. Kagawad Mangisel said that when he heard about the project what comes to his mind is the cost, because in reality, particularly in some remote barangays they don't even have a septic tank although he himself acknowledges the importance of proper collection and disposal of waste from households. Mr. Nyrh Cabance commented that such cost is part of the cost of building a house because it is required by law (Phil. Building Code). You cannot secure a building permit if you don't have a building plan that includes a septic tank. Mr. Mangisel pointed out that his concern was about the indigents or those who cannot afford, what are the alternatives. Mr. Cabance said that the government is considering alternatives such as public or "communal" toilet. Another alternative is for a group of 10-15 households to pool their resources together for construction of septic tank. Another alternative is to use cheaper materials such as steel drums for septic tank. The proposed sanitation ordinance would provide alternative means to comply with its requirements.
Participant	Does the local people support the proposed project?	All participants pledged to give their full support for the said project for everybody's welfare.
Hon. Samuel B. Velarde - Brgy. Captain, Brgy. Paraiso	Any critical issue or concern by the local people regarding the project?	Brgy. Chairman Velarde said that his only concern is about the cost of treatment. Mr. Nyrh Cabance said that the cost is not much. In Dumaguete, water consumers added P2.00/cu.m. as cost for the septage treatment. It started sometime in 2008. In Manila, every household adds 20% of water bill for septage collection and treatment. He added that ADB encourages WDs to combine water supply and sanitation for financing program.
Hon. Rogelio B. Joquino - Brgy. Captain, Brgy. Concepcion	Any critical issue or concern by the local people regarding the project?	Brgy. Chairman Joquino commented that just like in the case of SOCOTECO, we are paying for their system loss. What we need is information campaign or let the public realize the importance of this project and how will it benefit them in the long run.
None	Are there employment opportunities in the project?	No queries/Response
None	Any loss of residential or commercial structures due	No queries/Response

Name / Organization	Question	Response
	to the project	
None	Any loss of Community life (like market place, public playground) or Community Activities that will be affected?	No queries/Response
None	Would there be land acquisition that would result in resettlement, or would affect parks, forest, etc.?	No queries/Response
None	Will the project location adversely affect water resources?	No queries/comments
Ruben L. Valderama - Unified Toda, Secretary	Any other issues you want to share (security, cooperation from local communities)?	Mr. Valderama asked if there is a law prohibiting the use of a domestic pump or a pitcher pump? Mr. Nyrh Cabance said that it is not prohibited. However, the public is warned of the risk of contaminating drinking water if domestic pump is located near septic tank (should not be less than 25 m apart), which is not regularly maintained. Valderama also queried how deep should the domestic pump be for it to be free from any contaminations. Mr. Cabance replied that it depends upon the area/location but a deepwell (80-100 m deep) is safer because sewage undergoes treatment as it percolates through the ground. Lastly, Mr. Valderama asked if it is possible that the cost for the septage treatment facilities may be donated by ADB to CKWD? Mr. Cabance said that the LGU and the water district are both mandated to provide sanitation facilities, That's why the project is a joint undertaking of CKWD and the LGU. The city government may provide subsidies or incentives as part of its ordinance requiring regular desludging of septic tanks. He was informed by the mayor that the city has already acquired a 13.9 ha. land in Brgy. Paraiso for the city sanitary landfill and has allotted 1ha. for CKWD.
Hon. Rogelio B. Joquino -Brgy. Captain, Brgy Concepcion	Any other issues you want to share (security, cooperation from local communities)?	Brgy. Chairman Joquino said that one of his concerns is the proper place to dispose all those wastes because he had already witnessed some unscrupulous people disposing their wastes in rivers. Mr. Cabance said that the reason why he is encouraging the people to support the sanitation project is because it will reduce sickness in the community when wastes are treated properly before discharge.

Source: City of Koronadal Water District.

117. A briefing of the City Council of Koronadal was conducted on 14 January 2013. The CKWD general manager and the PPTA's environmental specialist presented the proposed water supply and the septage management projects to the council. Issues on the health effects of septic tank overflow if the tanks are made watertight were raised by one of the councilors. In response, it was pointed out that the proposed city ordinance on septage management should make it mandatory for households to desludge their septic tanks every 3-5 years. A copy of the septage management ordinance of Dumaguete City was requested. A soft copy of the ordinance was furnished to the secretary of the City Council, together with a copy of the memorandum of agreement between Dumaguete City Water District and the LGU of Dumaguete City.

118. The presentation materials used in the briefing of the City Council of Koronadal is attached as **Appendix D.**

B. Future Consultation and Disclosure

119. The IEE and other relevant documents will be made available at public locations in the city and posted on the ADB website. The consultation process will be continued during the Phase I of the subproject implementation. The IEC campaign will be conducted by the city government and the CKWD, specifically public hearings will be conducted by the city council in aid of the proposed ordinance on septage management program.

120. During detailed design, LWUA and CKWD will again conduct public consultations and information disclosure. A large group of stakeholders are expected to attend to this proposed consultations since proposed water tariffs will also be discussed. Views of the stakeholders will be considered in the overall design process. Stakeholders' consultations shall be continued throughout the duration of the construction phase. CKWD shall keep records of environmental and social complaints, received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues.

VII. GRIEVANCE REDRESS MECHANISM

121. A common grievance redress mechanism (GRM) will be established at the WD to receive, evaluate, and facilitate the resolution of AP's concerns, complaints, and grievances about the social and environmental performance related to the various subprojects. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. This mechanism shall be disclosed in public consultations during detailed design and in meetings during the construction phase.

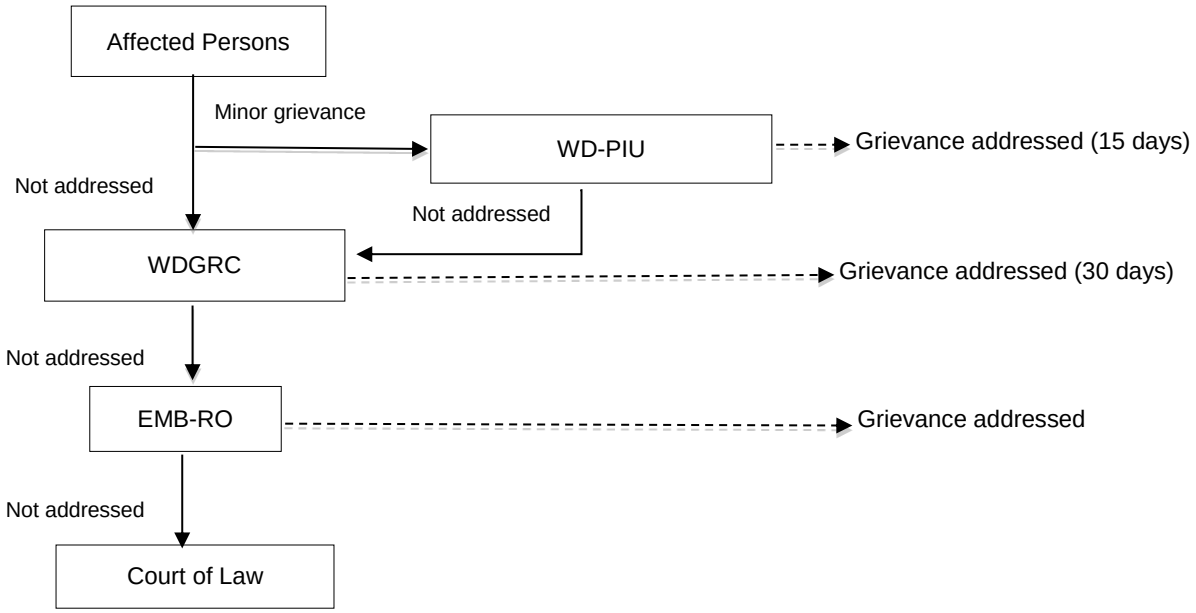
122. CKWD shall appoint Safeguards Officers in its PIU, and will form the WD Grievance Redress Committee (WDGRC) to be chaired by the Water District-General Manager. Members shall include the following: (i) the contractor's highest official at the site such as the Construction Manager or the Construction Superintendent, (ii) barangay officials, (iii) concerned NGOs, and (iv) women's organizations. Creation of the WDGRC and its operation shall be included in appropriate sections of the civil works contract. Expeditious resolution of complaints during construction is important since activities are sometimes continuous and can easily change the landscapes within a week. For the quick filing of complaints, the WDGRC shall prepare a form to be used for the filing of grievances/complaints. The use of form will also facilitate the filing of complaints by illiterate persons. A sample grievance registration form is in **Appendix E.**

123. The steps to be followed in filing complaints and the procedures for redress are the following: (i) complainant shall provide the background and file the complaint verbally or in writing to WDGRC. The project Public Relations Officer or the WD personnel on site shall assist the complainant in filling-up the complaint form; (ii) within 2 working days, the WD-PIU head, contractor's representative, and complainant shall discuss if the complaint can be resolved without calling for a WDGRC meeting; (iii) if the complaint cannot be resolved by the WD-PIU head and contractor's representative, a WDGRC meeting shall be called within 5 working days with the complainant to resolve the

complaint; (iv) if the complaint cannot be resolved by the WDGRC within 30 days, the complainant shall raise the issue to the EMB-Region XII; and (v) if the complaint cannot be resolve at the EMB level, the complainant shall seek recourse with the courts. If the complaints are based on violations of the ECC terms and conditions, the complainant has an option to also bring the issue to EMB-Regional Office. **Figure 4** shows the grievance redress process.

124. **Recordkeeping.** Records will be kept by the WD-PIU of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome.

Figure 4: Grievance Redress Process



WD=Water District, PIU=Project Implementation Unit, WDGRC=Water District Grievance Redress Committee, EMB-RO=Environmental Management Bureau-Regional Office.

125. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication, and information dissemination) will be borne by CKWD.

126. **Complaints to the Department of Environment and Natural Resources.** Complaints about environmental performance of subprojects issued an ECC can also be brought to the attention of DENR-EMB. The process of handling such complaints is described in the *Revised Procedural Manual (2007)* for the implementing rules and regulations of PD 1586. The steps that DENR-EMB may follow in handling complaints are: (i) DENR-EMB shall verify if the complaint is actionable under PD 1586, (ii) within 72 hours from receipt of a complaint DENR-EMB will send the proponent a Notice of Alleged Violation (NAV) and request for an official reply which explains why the proponent should not be penalized, (iii) DENR-EMB may conduct field validation, site inspection and verification or other activities to assess or validate the complaint. The proponent is given seven days to respond. The proponent's failure to respond to the NAV and further notices will force DENR-EMB to take legal action. DENR may issue a Cease and Desist Order (CDO) to project proponents which shall be effective immediately, based on: (i) violations under the Philippine EIS System, and (ii) situations that present grave or irreparable damage to the environment. PD 1586 also allows DENR to suspend or cancel the proponent's ECC if the terms and conditions have been violated.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

127. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

128. The EMP will be updated by CKWD during the detailed design stage. Upon clearance/approval by ADB, the updated EMP shall form part of the bidding document and/or contracts. The EMP will continually be updated as need arises.

129. A copy of the EMP must be kept on work sites at all times. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

A. Environmental Management Action Plan

130. The EMP will guide the environmentally sound construction of the subproject and ensure efficient lines of communication between the WD-PIU and the contractors. The EMP identifies activities for three phases: (i) site establishment and preliminary activities, including updating and/or finalizing the IEE/EMP; (ii) the construction stage; and (iii) the post-construction/operational stage. **Table 12** outlines the mitigation measures and persons responsible for implementation and monitoring.

Table 12: Environmental Mitigation Measures Action Plan

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Planning Phase						
Protection of water quality of the receiving water body and groundwater	• Waste characterization of the septage to be treated and the prescribed effluent standards will be determined to be used as basis for the design of the SpTF. • Design the efficiency of the treatment system to meet the prescribed effluent standards. • Undertake baseline water quality tests of the receiving body of water and the groundwater in the project site to serve as benchmark for subsequent monitoring.	CKWD-PIU and management	LWUA PMU	Significant water quality parameters (**Table 5)**	Monthly to consider seasonal changes	DENR DAO Nos. 34 and 35, series of 1990
Hauling of construction materials	• Ensure careful planning and scheduling of the activities. • To minimize impact on traffic flow and road users, as much as possible hauling of construction materials to be done at night. • Consider low-traffic and non-sensitive areas (other than schools, religious places, and commercial/business) for daytime transport. • Prepare a traffic management plan and road safety plan.	Contractor	CKWD safeguards officer/pollution control officer (SO/PCO) to approve schedule and areas	Plan and schedule for hauling of construction materials	Prior to start of civil works	Detailed schedule of transport of materials
Barricades and warning signs	• Use easily transportable barricades and warning signs such as those made of high reflector plastic materials. • Also use aluminized rolled warning signs to warn the public of the possible high vehicular traffic along the transport route of construction materials.	Contractor to submit information to CKWD as part of compliance report and construction method statement	CKWD SO/PCO	Lists and samples of warning signs and barricades	Prior to start of civil works	Detailed schedule of transport of materials
Reuse of excavated materials	• Excavated materials can be used to as filling materials for depressed areas of the property.	Contractor to submit sources of materials to CKWD	CKWD SO/PCO	Lists of construction materials	Prior to start of civil works	Detailed design documents

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Workers	• Employ workers with adequate experience, training, and know-how. It is always advantageous for the contractor to employ workers with adequate experience, training, and know-how in the line of work that they are doing. These people are usually reliable and can be counted upon to exercise good judgment in the field.	Contractor	Contractor's SO/PCO	Workers list	Prior to start of civil works	Detailed design documents
Community and public awareness	• Establish extensive coordination with the barangay and other government agencies, as may be needed. • An information campaign must precede any construction activity in order to make the public aware of the extent of the problem that might be present during the period of construction and operation of the facility. • Open liaison channels shall be established between the barangay, the contractors, and interested and affected parties such that any queries, complaints, or suggestions can be dealt with quickly and by the appropriate persons.	Contractor in coordination with barangay officials	CKWD SO/PCO	Communication and participation strategy	Prior to start of civil works	No complaints received
Surveys	• Land survey with objective to conduct control level survey, and control traverse survey to be used in the design.	Contractors	CKWD SO/PCO	Land surveys	Prior to start of civil works and as necessary	Detailed design documents
Legislation, permits, and agreements	• In all instances, CKWD and contractors must remain in compliance with relevant local and national legislations.	Contractor	CKWD SO/PCO	All applicable permits and approvals	Prior to award of contract and as necessary	ECC, Permit to Cut, Barangay Permit

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Access to site	• Access to site will be via existing roads and newly acquired right of way. The contractor will need to ascertain the existing condition of the roads and repair damage due to construction. • The local traffic police shall be involved in the planning stages of the route of construction materials. • The local traffic police must be informed at least a week in advance if the traffic in the area will be affected. • No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the EMB-RO.	Contractor	CKWD SO/PCO	Traffic management plan	Prior to start of civil works	No complaints received Minimal traffic disturbance
Setting up of construction camp	• Choice of site for the facilities must take into account location of local residents, businesses, and existing land uses, including flood zones and slip/unstable zones. • If the contractor chooses to locate the camp site on private land, he must get prior permission from the landowner. • Use portable toilet facilities (PORTALETS). Under no circumstances may open areas or surrounding bushes be used as toilet facility. • Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged.	Contractor	CKWD SO/PCO	Location plan	Prior to start of civil works	Approved location plan Construction method No complaints received
Establishing equipment lay-down and storage area	• Storage areas shall be secure so as to minimize the risk of crime. They shall also be safe from access by children, animals, etc.	Contractor	CKWD SO/PCO	Location plan		Approved location plan Construction method No complaints received

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Materials management – sourcing	• The contractor shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, etc), and submit these to CKWD for approval prior to commencement of any work.	Contractor to submit sources of materials to CKWD	CKWD SO/PCO	Lists of sources	Prior to start of civil works	Standards prescribed by CKWD
Education of site staff on general and environmental conduct	• Ensure that all site personnel have a basic level of environmental awareness. • Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task.	Contractor	CKWD SO/PCO	Records of orientation	Prior to start of civil works and every new employee	Environmental management plan (capacity building)
Construction phase						
Excavations	• The excavated earth shall always be dumped on the designated areas to be resused as needed. • In the event that excavations are to be kept open overnight, lights, high visibility warning signs, and barricades shall be provided.	Contractor	CKWD SO/PCO	Construction method statement	As work progresses	Construction method Detailed design documents
Hauling of excavated materials	• The contractor shall haul away all excavated materials from the excavation site and deposit these in an area designated by CKWD. • The stockpile shall be processed where it is deposited so that it can be brought back to the trenches as selected filling material.	Contractor	CKWD SO/PCO	Construction method statement	As work progresses	Construction method Detailed design documents
Reuse of excavated materials	• The contractor can process the excavated materials at the disposal site and use these as selected backfill materials. • If excavated materials are not suitable for reuse, the contractor shall deposit these in an area designated by CKWD.	Contractor	CKWD SO/PCO	Construction method statement and inventory	As work progresses	Construction method Detailed design documents Zero complaints from community
Equipment	• The contractor shall use small mechanical excavators in appropriate areas to fast tract the construction.	Contractor	CKWD SO/PCO	Construction method statement	As work progresses	Construction method Detailed design documents

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Temporary construction facilities and storage areas	• The contractor is to ensure that open areas or the surrounding bushes are not being used as toilet facility. • The contractor shall ensure that all litter is collected from the work areas daily. • Bins shall be emptied regularly and waste shall be disposed of at the pre-approved site. • The contractor shall ensure that his camp and working areas are kept clean and tidy at all times. • After construction work, all structures comprising the construction camp are to be removed from site or handed over to the property owner/community as per mutual agreement (if established on private/community land). • The area that previously housed the temporary construction facilities is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. • The contractor must arrange the cancellation of all temporary services.	Contractor	CKWD SO/PCO	Vehicle emission testing records Complaints from community	As work progresses	No visible increase in dust and particulate matters Zero complaints from community
Dust and air pollution	• Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid producing excessive dust. • Access and other cleared surfaces, including backfilled trenches, must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust. • Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption, and emission.	Contractor	CKWD SO/PCO	Complaints from community Waste disposal record	As work progresses	No visible increase in water pollution due to the project Zero complaints from community

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Noise levels	• Noise-generating equipment must be fitted with silencers. • If a worker is exposed to noise above a noise exposure limit, the contractor must investigate options for engineered noise control such as using low-noise excavators, jackhammers, drills, and power generators. • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection.	Contractor	CKWD SO/PCO	Complaints form community Noise level monitoring record	As work progresses	Environmental Management Bureau-Region XII Noise Regulations
Water quality	• Every effort shall be made to ensure that any chemicals or hazardous substances do not contaminate the soil or water on-site. • Care must be taken to ensure that runoff from vehicle or plant washing does not enter the surface/ground water. • Site staff shall not be permitted to use any stream, river, other open water body, or natural water source adjacent to or within the designated site for the for disposing wastes. • All concrete mixing must take place on a designated, impermeable surface. • No vehicles transporting concrete to the site may be washed on-site. • No vehicles transporting, placing, or compacting asphalt or any other bituminous product may be washed on-site. • All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of removed from the site. • Hazardous substance/ materials are to be transported in sealed containers or bags.	Contractor	CKWD SO/PCO	Complaints from community Waste disposal manifest/record	As work progresses	No dumped wastes and litter at work sites at all times Zero complaints from community

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Waste management	• Wastes must be placed in the designated bins which must be regularly emptied. These shall remain within demarcated areas and shall be designed to prevent wastes from being blown out by wind. • Littering on-site is forbidden and the site shall be cleared of litter at the end of each working day/night period. • Recycling is to be encouraged by providing separate receptacles for different types of wastes and making sure that staff is aware of their uses. • All waste must be removed from the site and transported to a disposal site. • Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the environment management specialist, or at disposal sites.	Contractor	CKWD SO/PCO	Complaints from community Waste disposal manifest/record	As work progresses	No dumped wastes and litter at work sites at all times Zero complaints from community
Conservation of natural environment	• Only trees that are covered by Permit to Cut are to be removed, if cutting of trees is required.	Contractor	CKWD SO/PCO	Complaints from community	As work progresses	Zero compliant from community
Cultural and historical environment	• If something of archeological importance is uncovered, the National Museum or the DENR shall be contacted and work shall be stopped immediately.	Contractor	CKWD SO/PCO	Chance finds	As necessary	All chance finds shall be reported and turned over to the National Museum.
Safeguards supervisor or pollution control officer	• The contractor shall appoint one environment safeguard supervisor or pollution control officer who will be responsible for assisting the contractor in implementation of EMP, coordinating with the EMB-RO, community liaison, consultations with interested/affected parties, reporting, and grievance redressal on a day-to-day basis.	Contractor	CKWD SO/PCO	Hiring and actual work	As work progresses	Continuous work output and reporting records

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Post-construction phase (prior to turnover to CKWD)						
Access	• Damaged roads shall be reinstated to original or better condition.	Contractor	CKWD SO/PCO	Road conditions	Prior to turn-over	Pre-existing conditions
Utilities and other existing infrastructure	• All disrupted utilities restored • All affected structures rehabilitated/compensated	Contractor	CKWD SO/PCO	All affected utilities	Immediately after civil works	All disrupted services restored
Temporary construction facilities and storage areas	• After construction work, all structures comprising the temporary facilities are to be removed from site or handed over to the property owner/community as per mutual agreement (if established on private/community land). • The area that previously housed the temporary facilities is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. • All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. • The contractor must arrange the cancellation of all temporary services	Contractor	CKWD SO/PCO	General condition of the areas	Prior to end of construction period/demobilization	Pre-existing condition
Discharge permit	• Contractor shall secure the first discharge permit from EMB-RO to ensure that the SpTF is compliant with the prescribed effluent standards.	Contractor	CKWD-SO/PCO	Effluent quality	Monthly	Prescribed effluent standards
Waste management	• All wastes shall be removed from the site and transported to a disposal site or as directed by the PCO.	Contractor	CKWD SO/PCO	General condition of the areas	Prior to end of construction period/demobilization	Pre-existing condition

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Operation and maintenance phase						
Treatment efficiency	• Procedure for each step of operation shall be documented and all workers/operators shall be trained on the proper opertion of each component of the SpTF, including the proper desludging procedure for steptic tanks. • Although impact is likely to be minimal due to new and well-designed efficient system, it must be ensured that the facility is operating properly at all times.	CKWD	EMB-RO	Quarterly submission of self-monitoring report	Quarterly	Prescribed effluent standards of EMB-RO
Discharge of treated effluent	• Quality of discharge shall be regularly monitored to ensure that effluent quality complies with the prescribed effluent standards. • Treated effluent can also be used in watering vegetation around the area especially during summer. • During malfunctioning, effluent shall be diverted to the sanitary landfill.	CKWD	EMB-RO	Quarterly submission of self-monitoring report	Quarterly, as part of operations and maintenance of the SpTF	Prescribed effluent standards of EMB-RO
Solid waste	• Dried sludge (bio-solids) from the drying bed shall be used as soil conditioner to enhance soil fertility in nearby farms.	CKWD	EMB-RO	Quarterly submission of self-monitoring report	Quarterly	Solid waste management protocol of EMB-RO
Public awareness	• The LGU of the City of Koronadal and the CKWD shall work together in increasing public awareness in septage management to ensure full compliance and cooperation of the general public. School children shall also be target for IEC campaign. • CKWD and the city government will implement a septage management program jointly.	LGU-CKWD	LWUA PMU	Public awareness	Annually	Request for desludging attended to in timely manner No complaint

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Decrease in dissolved oxygen level in ponds due to climate change	• Increase dissolved oxygen concentration in ponds by cascading flow or by installation of mechanical aerators when appropriate.	CKWD	EMB-Reg. XII	Effluent quality	Monthly	DENR DAO No. 35
Damage due to natural risks, such as earthquake and flood	• Design and construction of the subproject shall conform to the criteria mandated by the LGU-DPWH guidelines to ensure structural integrity. • Re-vegetation of steep slopes.	CKWD	LGU-DPWH	Integrity of structure	After occurrence of event	Record of events

CKWD=City of Koronadal Water District, DENR=Department of Environment and Natural Resources, EMB-RO=Environmental Management Bureau-Regional Office, EMP=Environmental Management Plan, IEC=Information, Education, and Communication, LGU=Local Government Unit, LWUA=Local Water Utilities Administration, SpTF=Septage Treatment Facility.

Source: PPTA Consultant

131. Although details of the required mitigating measures are already discussed in **Table 11**, the following items are discussed further to highlight their importance: (i) tender documents and construction contracts, (ii) contractor's environmental management plan, (iii) construction site management plan, (iv) operator's manual, (v) source protection study and wellhead protection plan, and (vi) unanticipated environmental impacts.

132. **Environmental Compliance Certificate and Discharge Permit.** In accordance with the DENR Memorandum Circular No. 2010-14, the ECC based on the submission of an EIS shall be issued within 40 working days, the IEE report-based ECC, within 20 working days, and CNC applications shall be processed within the same day of receipt at the designated DENR-EMB office. On the other hand, the Discharge Permit from EMB-Reg. XII is normally issued within 20 working days after submission of the appropriate application.

133. In compliance with SPS requirements, the ECC shall be secured by CKWD prior to any awarding of contract. The Discharge Permit shall be secured prior to any commissioning activities.

134. **Tender documents and construction contracts.** Environmentally responsible procurement advocates the inclusion in construction contract documents of the provisions addressing the management of environmental impacts and risk during construction. This includes the contractor's submittal of a Contractor's Environmental Management Plan (CEMP). Tender documents and construction contracts shall therefore include environmental management provisions on the following issues: (i) erosion and sediment runoff, (ii) noise and dust, (iii) vehicular traffic, (iv) construction wastes, (v) oil and fuel spillages, (vi) temporary construction facilities, and (vii) public safety and convenience.

135. The updated EMP, upon clearance by the EA and then ADB, shall form part of the tender documents and construction contracts. The contractor shall revise and prepare a detailed CEMP, based on the updated EMP, that will also be in compliance with the contractor's internal HSE standards and requirements. No funds shall be released to the contractor without the submission of the CEMP.

136. **Contractor's environmental management plan.** During construction, each contractor will be guided by its detailed CEMP. The ADB-approved EMP shall be the minimum requirement in the preparation of the CEMP.

137. The CEMP shall be prepared by all contractors, endorsed by CKWD's PIU and approved/cleared by ADB prior to the commencement of any work on site. This requirement shall be included in the construction contracts. The CEMP shall provide details on specific items related to the environmental aspects during construction. It shall include specifications on requirements for dust control, erosion and sediment control, avoidance of casual standing water, management of solid wastes, workers' camp sanitation, pollution from oil, grease, fuel spills, and other materials due to the operation of construction machineries, safety and traffic management, avoidance of inconveniences to the public, air and noise pollution control. It shall also include guidance on the proper design of the construction zone, careful management of stockpiles, vegetation, topsoil, and vehicles and machinery.

138. **Operator's manual.** The contractor and CKWD shall develop an operator's manual for the O&M of the SpTF to serve as a handy guide for the facilities operator and workers. Among others, it shall contain (i) the step-by-step operation of the

facilities, including its maintenance; (ii) relevant sections of the EMP; (iii) reporting requirements of the EMB-RO, LWUA and ADB; and (iv) process control procedures.

139. **Unanticipated environmental impacts.** Where unanticipated environmental impacts become apparent during project implementation, CKWD shall prepare a supplementary environmental assessment and EMP to assess the potential impacts and outline mitigation measures and resources to address those impacts.

B. Reporting

140. During the construction period, the contractor shall submit to the PIU a monthly environmental monitoring report (to be appended to its monthly progress report). The reports shall be consolidated by the construction supervision consultant for submission to CKWD on a quarterly basis. After review, the quarterly environmental monitoring report shall be submitted by CKWD to LWUA. The LWUA shall review the reports and submit a consolidated report for all subprojects covered by the sectoral loan to ADB on a semi-annual basis.

141. During operation, CKWD shall comply with the quarterly submission of self-monitoring report to EMB-RO. These reports can be compiled and shall form part of the annual report to LWUA and ADB.

C. Implementation Arrangement

142. **Institutional Setup.** LWUA is the executing agency, while CKWD is the implementing agency. LWUA has overall responsibility for project coordination, implementation, and liaison with ADB and other government offices. LWUA will establish a project management unit (PMU) to coordinate implementation at the national level, including procurement of goods, works, and services. A PMU staff shall be designated as the Environment Officer for the project. At the subproject level, CKWD will be responsible during construction and operation phase of the subproject. During the construction phase, CKWD shall establish a project implementation unit (PIU) with a safeguards officer-cum-pollution control officer to work closely with LWUA's PMU and the EMB-RO. A team of consultants will assist LWUA's PMU and CKWD during pre-construction and construction phases. The role of the WDGRC during the construction phase is highlighted since it is an important aspect of the grievance redress mechanism in promptly addressing the public's complaints about environmental performance of the subproject during execution of the construction activities.

143. CKWD will provide all the necessary logistic support (vehicle, computers, support staff, etc.) to the PIU for carrying out the related activities for environmental and social safeguard implementation and monitoring. CKWD will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all applicable labor laws and core labor standards on (i) prohibition of child labor as defined in national legislation for construction and maintenance activities; (ii) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; (iii) elimination of forced labor; and (iv) the requirement to disseminate information on health to employees and local communities surrounding the project sites.

144. The CKWD PIU will also be responsible for implementing and monitoring safeguards compliance activities, public relations activities, gender mainstreaming activities, and community participation activities. The PIU will have a SO/PCO, who will be responsible for safeguards functions. The responsibility of the SO/PCO is to: (i) ensure that the EARF provisions are observed, such as ensuring that works are

selected according to the environmental criteria for subproject selection; (ii) review and approve project IEEs and EMPs; (iii) confirm existing IEEs and EMPs are updated based on detailed designs; (iv) confirm whether the EMPs are included in bidding documents and civil works contracts; (v) provide oversight on environmental management aspects of the subproject and ensure EMPs are implemented by the contractors; (vi) establish a system to monitor environmental safeguards of all subprojects including monitoring the indicators set out in the monitoring plan of the EMPs; (vii) facilitate and confirm overall compliance with all government rules and regulations regarding site and environmental clearances as well as any other environmental requirements, as relevant; (viii) review, monitor and evaluate the effectiveness with which the EMPs is implemented, and recommend necessary corrective actions to be taken as necessary; (ix) consolidate environmental monitoring reports and submit quarterly or semi-annual monitoring reports to EMB-XII, LWUA, and ADB; (x) ensure timely disclosure of final IEEs/EMPs in locations and form accessible to the public, and (xi) address any grievances brought about through the GRM in a timely manner. The monitoring report will focus on the progress of implementation of the IEEs and RPs, issues encountered and measures adopted, follow-up actions required, if any, as well as status of compliance with relevant loan covenants.

145. **Contractor.** The contractor will have an environment supervisor or pollution control officer to (i) coordinate with CKWD on updating the IEEs/EMPs based on detailed designs, and (ii) and ensure implementation of each EMPs during civil works.

146. **Clearances and permits.** Under PEISS, CKWD shall apply for an ECC by submitting an EIS to EMB-Region XII for the proposed SpTF at the pre-construction phase. CKWD must secure a discharge permit from the EMB-RO during the operation of the SpTF. It is recommended that before the facilty is turned over to CKWD, the first discharge permit for the facility be secured by the contractor from EMB-RO to confirm its compliance with the prescribed effluent standards. If trees have to be cut, the necessary Permits to Cut will be secured by the contractor.

D. Capacity Building

147. CKWD will organize orientation workshop for PIU officials and staff involved in the project implementation on: (i) ADB SPS (2009), applicable laws, rules and regulations on environment; (ii) induction course for the training of contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures, and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing. The contractor will also be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. Training of SpTF operators will also be conducted upon completion of the facility.

E. Environmental Costs

148. The main environmental cost to be borne by CKWD is the cost of securing the ECC from EMB-Region XII by submitting an EIS for the subproject. The cost covers the processing of the ECC application. Also, the periodic environmental monitoring during the operation phase is an annual recurring expense of CKWD.

149. The costs for public consultations and information disclosure, and capacity building are major costs that are covered under the subproject.

150. The contractor's cost for site establishment, preliminary activities, construction, defect liability activities, and environmental mitigation measures related to EMP implementation during planning, design, and construction will be incorporated into the contractual agreements and engineers costs, which will be binding on him for implementation. The survey will be conducted by the contractor.

151. The operation phase mitigation measures are again good operating practices, which will be the responsibility of CKWD, as the implementing agency. All monitoring during the O&M phase will be conducted by CKWD; therefore, there are no additional costs.

152. The activities identified in the EMP mainly include site inspections and informal discussions with workers and local community, and this will be the responsibility of CKWD-PIU, costs of which are part of project management.

153. **Table 13** presents the estimated cost to implement the EMP.

Table 13: Cost for Implementation of the EMP

Component	**Description**	**Number**	**Cost per Unit** (PhP)	**Cost** (PhP)	**Source of Funds**
Legislation, permits, and agreements	Securing ECC from EMB-RO	Once	Not Applicable	50,000	CKWD to secure ECC at its expense.
Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	As per requirement	Lump sum	1,720,000	Part of the loan package
Capacity building	(i) Orientation workshop CKWD officials and staff involved in the project implementation on ADB SPS (2009), applicable laws, rules and regulations on environment; (ii) induction course for the training of contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing. Training of the SpTF operators will also be	Four modules, one day per module	30,000 per module	120,000. Cost is integrated in the public consultation and information disclosure	Part of the loan package

Component	Description	Number	Cost per Unit (PhP)	Cost (PhP)	Source of Funds
	conducted.				
Dust suppression at work sites	Application of dust suppression measures during construction phase	As required	Contractor's liability	5,000. Covered in the contract	Covered under construction contract
Traffic management	Safety signboards, temporary diversions, etc.	Wherever required throughout the project corridor	Contractor's liability	Not applicable	Covered under construction contract
Baseline water quality monitoring	Water quality characterization of receiving water body, groundwater, and septage sample	Two samples each	15,000/set of samples	60,000	Covered under engineering design contractor
Surveys	Ongoing before start of construction work	Lump sum	Contractor's liability	15,000	Covered under engineering design contractor
Periodic environmental monitoring	Effluent quality monitoring	Quarterly, one set sample per station	15,000/set of samples	60,000 anually	Under CKWD's operating expense
Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period	Lump sum	Contractor's liability	As per insurance requirement	Covered under engineering design and consrruction cost – contractor's insurance

Source: PPTA Consultant.

IX. CONCLUSION AND RECOMMENDATIONS

154. The proposed septage management subproject will provide septage collection, treatment and disposal of waste from households and commercial establishments in the City of Koronadal. This stage of program implementation will

be preceded by the promulgation of a city ordinance on septage management and IEC on sanitation.

155. The environmental assessment process has highlighted the environmental issues and concerns of the proposed subproject. It has not identified any significant negative environmental impacts that cannot be mitigated. The environmental assessment considered the fact that proposed site for the SpTF is beside the proposed sanitary landfill of the city and will have no significant negative impact on the surrounding residential, and agricultural landscape. Collection and transport of septage will be undertaken in accordance with the septage management ordinance to be promulgated by the city government.

156. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

157. The subproject will benefit the general public by contributing to the long-term improvement of public health and community livability in the city. The potential adverse environmental impacts are mainly related to the abnormal or malfunctioning of the SpTF during its operation, which can be minimized by the mitigating measures including diversion of the partially treated effluent to the landfill.

158. Based on this IEE, the determination of environment category as “B” in accordance with ADB’s SPS 2009 is confirmed. With the implementation of the mitigation measures as proposed in the EMP, the subproject is not expected to cause irreversible adverse environment impacts. Also, the septage treatment subproject can be implemented in an environmentally acceptable manner without the need for further environmental assessment study.

159. Furthermore, under the PEISS, sewage treatment with more than 5,000 m^3 of waste to be treated annually, requires submission of an EIS to the EMB-RO for securing an ECC. In this regard, this IEE will greatly help CKWD in complying with the requirements of the PEISS.

X. REFERENCES

Asian Development Bank (ADB). 1993. *Environmental Guidelines for Selected Infrastructure Projects*. Office of the Environment, Asian Development Bank.

____. 1998. *Environmental Assessment Requirements of the Asian Development Bank*. Environment Division Office of the Environment and Social Development, Asian Development Bank.

____. 2003. *Rapid Environmental Assessment (REA) Checklist for Sewage Treatment.* ADB Online.

____. 2009. Safeguard Policy Statement. Manila.

Barangay Paraiso. 2003. Barangay Development Plan for Calendar Year 2003-2007. Barangay Paraiso, City of Koronadal, Province of South Cotabato.

Department of Environment and Natural Resources (DENR). 1990. Revised Water Usage and Classification/Water Quality Criteria of 1990. DENR Administrative Order No. 34. Manila.

Department of Environment and Natural Resources (DENR). 1990. Revised Effluent Regulations of 1990. DENR Administrative Order No. 35. Manila.

Environmental Management Bureau. 2008. Revised Procedural Manual for DENR Administrative Order No. 30, series of 2003. Manila.

National Water Resources Board. 2011. Water Code of the Philippines and the Amended Implementing Rules and Regulations. Manila.

Poyry-IDP Consult. 2009. Subproject Appraisal Report: City of Koronadal Water District. ADB TA7122-PHI. Manila.

World Bank (WB). 1991. Environmental Assessment Sourcebook Volume II – Sectoral Guidelines.

____ (WB). 2006. Philippine Sanitation Sourcebook and Decision Aid.

APPENDIX A:

ADB RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST

SEWAGE TREATMENT
page 1 of 4

Rapid Environmental Assessment (REA) Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: TA 7122-PHI. Water District Development Sector Project (WDDSP) *based on Septage Treatment System of the City of Koronadal Water District*

Sector Division: SEUW/SERD

Screening Questions	Yes	No	Remarks
B. Project Siting Is the project area…			*See below*
• Densely populated?		✓	*Low density population.* The proposed site (Brgy. Paraiso) is a rural/agriculture area that is *sparsely populated* (2.4 person per hectare)
• Heavy with development activities?		✓	The proposed site is mainly agricultural with some micro-scale commercial activities (i.e., *sari-sari* stores).
• Adjacent to or within any environmentally sensitive areas?			*See below*
• Cultural heritage site		✓	There is no known site of archeological or cultural significance in the area.
• Protected Area		✓	The project site is not within protected area.
• Wetland		✓	There is no wetland in the area.
• Mangrove		✓	There is no mangrove in the area.
• Estuarine		✓	There is no estuarine in the area.
• Buffer zone of protected area		✓	The project site is not near any protected area.
• Special area for protecting biodiversity		✓	The project site is not within protected/biodiversity area.
• Bay		✓	There is no bay in the area.
A. Potential Environmental Impacts Will the Project cause…			*See below*
• Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	There is no known site of archeological or cultural significance in the area.

SEWAGE TREATMENT
page 2 of 4

Screening Questions	Yes	No	Remarks
▪ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		✓	*None to minimal.* The project site is far from residential areas. Septage will be delivered on-site using vacuum trucks. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ dislocation or involuntary resettlement of people?		✓	The project site is non-residential. No permanent housing units.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	*Not applicable.*
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		✓	In case of malfunction, partially treated effluent will be diverted to the nearby sanitary landfill. During dry season, treated effluent will be used to water vegetation around the area. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ overflows and flooding of neighboring properties with raw sewage?		✓	In case of malfunction, partially treated effluent will be diverted to the nearby sanitary landfill. During dry season, treated effluent will be used to water vegetation around the area. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		✓	Dried bio-solids will be used as soil conditioners. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ noise and vibration due to blasting and other civil works?		✓	*None to minimal.* Construction will not involve blasting. Also, the project site is far from residential areas. Appropriate mitigating measures will be included in the EMP.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical,and biological hazards during project construction and operation?	✓		*Minimal.* Minimal exposure to construction hazards as well untreated septage. Use of PPEs (e.g., gloves, masks, protective clothing) will be required and other occupational/health/safety standards will be implemented during both construction and operation phase. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		✓	*Not applicable.*
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		✓	The project site, beside the landfill, is far from residential areas. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ road blocking and temporary flooding due to land excavation during the rainy season?		✓	*Not applicable – construction will be undertaken during dry season.*
▪ noise and dust from construction activities?		✓	Minimal due to distance from residential area/s. Appropriate mitigating measures will be included in the EMP.
▪ traffic disturbances due to construction material transport and wastes?		✓	Minimal due to distance from residential area/s. Appropriate mitigating measures will be included in the EMP.
▪ temporary silt runoff due to construction?		✓	*Not applicable – construction will be undertaken during dry season.*

SEWAGE TREATMENT
page 3 of 4

Screening Questions	Yes	No	Remarks
• hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		✓	In case of malfunction, partially treated effluent will be diverted to the nearby sanitary landfill. During dry season, treated effluent will be used to water vegetation around the area. Appropriate mitigating measures will be included in the EMP and/or operational plans.
• deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		✓	In case of malfunction, partially treated effluent will be diverted to the nearby sanitary landfill. During dry season, treated effluent will be used to water vegetation around the area. Appropriate mitigating measures will be included in the EMP and/or operational plans.
• contamination of surface and ground waters due to sludge disposal on land?		✓	In case of malfunction, partially treated effluent will be diverted to the nearby sanitary landfill. During dry season, treated effluent will be used to water vegetation around the area. Appropriate mitigating measures will be included in the EMP and/or operational plans.
• health and safety hazards to workers from toxic gases and hazardous materials which maybe contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge?	✓		Minimal. Minimal exposure to untreated septage. Use of PPEs (e.g., gloves, masks, protective clothing) will be required and other occupational/health/safety standards will be implemented. Appropriate mitigating measures will be included in the EMP and/or operational plans.
• large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		✓	Manpower requirement during construction and operation are small. Priority will be accorded to the host community. Appropriate social measures will be included in the EMP as may be specified in IR/IP/Social safeguards documents.
• social conflicts between construction workers from other areas and community workers?		✓	Manpower requirement during construction and operation are small. Priority will be accorded to the host community. Appropriate social measures will be included in the EMP as may be specified in IR/IP/Social safeguards documents.
• risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	*Not applicable.* Construction will not involve blasting.
• community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	The project site, provided with perimeter fencing, is far from residential areas. Also, septage will be transported using vacuum truck/s. Other appropriate mitigating measures will be included in the EMP and/or operational plans.

SEWAGE TREATMENT
page 4 of 4

Climate Change and Dicaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	**Yes**	**No**	**Remarks**
• Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?	✓		Earthquake and flood are natural risks that can be mitigated by designing civil works consistent with the Philippine Building Code.
• Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost?		✓	Minimal effect.
• Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		✓	Proposed project will not impact any marginalized population, rural-urban migrants, illegal settlement, etc.
• Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)?		✓	Proposed project is not expected to increase population/housing in the area.

APPENDIX B:

DOCUMENTATION OF THE PUBLIC CONSULTATION HELD ON 18 AUGUST 2009

Annex A
DOCUMENTATION OF PUBLIC CONSULTATION HELD ON 18 AUGUST 2009

Annex A1: List of Participants

Stakeholders/Participants:

- Raoul Galia – Engineer I, City Engineers Office
- Antonia C. Cordova – Engineer I, City Engineers Office
- Elvira D. Magbanua –Pollution Engineer, City ENRO
- Augustos Bretana – City Enro, City ENRO
- Agnes D. Daguro – CPDC, LGU-Koronadal
- Lorna J. Montequi – SI-CHO, LGU-Koronadal
- Ramon L. Saguta-on – PROTECH, Prov of South Cotabatao

At CKWD Office Meeting
- Rogelio B. Joaquin – Brgy. Chairman, LGU-Concepcion
- Roger S. Mangubat – Brgy. Chairman, LGU-Saravia

City of Koronadal Water District (CKWD) and WDDSP Team

- Fred Fabellon – Interim General Manager (IGM), CKWD
- Rey Sanlap – CSO-B, CKWD
- Aser Sadana – OSA, CKWD
- Josephine Cosep – CAA, CKWD
- Ma. Lourdes Salutorio – ASO-B, CKWD
- Reyes Callao – WMM-B, CKWD
- Corazon Sagutaon – J.O, CKWD
- Jonathan Gadayan - J.O, CKWD
- D. Dagoso, Jr – J.O., CKWD
- Juliet Villegas – consultant, Poyry-IDP
- Ruel Janolino – consultant, Poyry-IDP
- Bonifacio Magtibay – consultant, Poyry-IDP

Annex A2: Minutes of the Public Consultation Held at Ramona Hotel and at the CKWD Office, City of Koronadal

Opening/ Presentations of 1st Meeting:

The public consultation/meeting started at 1:30 P.M. with CKWD's Interim GM, Mr. Fred Fabellon, welcoming the participants and thanked them for positively responding to CKWD's invitation.

CKWD's Interim GM presented the detailed aspects of the proposed water supply system and septage management program.

Mr. Bonifacion Magtibay, WDDSP's Sanitation Specialist, gave a brief presentation of the proposed septage management program as a component of the proposed ADB-funded project.

Comments, Views, Issues and Concerns of 1st Meeting

Ms. Lorna J. Montequi, Koronadal City Health Office (CHO), expressed appreciation of the proposed septage management program since incidence of waterborne diseases usually increased during rainy season. WDDSP's Sanitation Specialist explained that the proposed septage management program will greatly help the city in controlling the spread of septic tank effluents. Rainwater can easily spread the effluents.

Ms. Agnes Daguro, Koronadal City Planning Office, expressed her reservations on the positive impact of the proposed septage management program since only 10% of the households have functioning septic tanks as estimated. WDDSP's Sanitation Specialist explained that the project has a revolving fund for septic tanks repair. This can be implemented in phases, while continuously doing aggressive information campaign. WDDSP's Resettlement Specialist explained that the project is studying the possibility of involving women's organizations in implementing the financing of septic tanks repair using the revolving fund.

WDDSP's Sanitation Specialist suggested a joint WD-CHO information campaign to increase 'buy-in" to the septage management program and possible increase in the number of water service connections.

Mr. Raoul Galia, City Engineers Office, have reservations on the viability of the septage management program if only 10% of the households can participate since it might result to a significant increase in water tariff to recover the cost for operation and maintenance. WDDSP's Sanitation Specialist explained that financing concerns are being analyzed under the PPTA and data on septic tanks will be validated during detailed engineering design phase.

CKWD's Interim GM suggested that the LGU may manage the septage management system and the WD will provide assistance if needed. The LGU representatives said they would still study their readiness to accept this task and it would also require City Council approval. They requested detailed cost estimates of the proposed system to be used for City Council presentation. WDDSP's Sanitation Specialist explained that detailed cost estimates are not yet finalized.

Juliet Villegas of WDDSP asked if the participants have additional issues to raise. After confirming that there were no more issues, CKWD's Interim GM closed the meeting by thanking everyone for participating in the public consultation.

1st Meeting Closed at 2:30 P.M.

Discussions of 2nd Meeting

A 2nd meeting was held at CKWD's Office immediately after the 1st meeting at Ramona Hotel. Aside from the WDDSP Team, stakeholders of this 2nd meeting were only the Barangay Chairmen of Saravia and Concepcion.

Mr. Rogelio Joaquin, Barangay Chairman of Concepcion expressed appreciation of the proposed water supply system since people of his area are buying drinking water from water stations. Barangay Concepcion has poor quality groundwater. The WDDSP Team explained that the project will definitely serve Barangay Concepcion since the pipeline will pass through the area.

Mr. Joaquin requested CKWD to ensure that public safety and convenience shall be addressed properly during pipelaying activities particularly near schools. WDDSP's Environmental Specialist explained that civil works contracts will include provisions requiring the contractors to properly address public safety and convenience during construction.

Both Barangay Chairmen said they have no problem in participating with the septage management program since they believed there is need for regular desludging of septic tanks. They expressed full support to the proposed water supply and sanitation project. CKWD's Interim GM welcomed the expression of support from the Barangay Chairmen.

2nd Meeting Closed at 4:00 P.M.

Annex A3: Attendance Sheet of the Participants

TA 7122-PHI: WATER DISTRICT DEVELOMENT SECTOR PROJECT
LIST OF PUBLIC CONSULTATION PARTICIPANTS
PROPOSED WATER SUPPLY AND SANITATION PROJECT OF KORONADAL CITY WATER DISTRICT

CONSULTATION DATE: 18 AUGUST 2009

No.	Name	Designation	Organization	Signature
	RAMIL G. GALIA	ENGINEER I	CITY ENGR'S OFFICE	
	ANTONIA C. CORDOVA	ENG'I AIDE II	City Engr's Office	
	ASER SADAVA	OSA	CKWD	
	REY J. VANCIO	CSO-B	CKWD	
	JOSEPHINE J. COVEP	CAA	CKWD	
	Fred F. Fobellon	IGM	CKWD	
	Ma. lourdes G. Santoria	ASO-B	CKWD	
	Elvira D. Magbanua	Wastewater & Pol. Engr.	City ENRO	
	AUGUSTUS BRETANA	City ENRO	City ENRO	
	Agnes D. Dagum	CPDC	LGU Kor.	
	ROSAS S. CALVO	WMM-B	CKWD	
	Lorna J. Monteja	S1 - CHO	LGU Kor.	
	CORAZON D. SAGUTA-ON	J.O	CKWD	
	JONATHAN R. GADAYAN	J.O - C.E	CKWD	
	D. DURAGOS JR.	J.O. - AutoCAD OPERATOR	CKWD	
	RAMON L. SAGUTA-ON		PROTECH, PROV OF SO. COT.	
	Rogelio B. Joaquin	Punong Barangay	LGU - CONCEPCION	
	ROGER J. MANGUBAT	P. BARANGAY	LGU - SARAVIA	
	Jett Villegas	Consultant	Paguy - IDP	
	RUEL JANDOLINO	ENV Consultant	PORRM - IDP	
	BONIFACIO MAGTIBAY	Sanitation Specialist	Pogny - IDP	

Annex A3: Attendance Sheet of the Participants (Continuation)

No.	Name	Designation	Organization	Signature
22	NELSON I. PALAYAN, MD	Municipal Health Officer Tayabas, Quezon	Tayabas Local Government Unit	
23	ARLENE A. REYES	Finance Manager	QMWD	
24	Angela Rosa Lopez	Records Section	QMWD	
25	Christian Alinday	Utility	QMWD	
26	JOY GUERRA		QMWD	
27	Cecille Solon	Supervisor	QMWD	
28	Andy T.	Staff	QMWD	
29	Khay A.			
30.	Ruben Magno	OEM STAFF	QMWD	
31.	Nini Francia	Tayabas Branch Mgr.	QMWD	

Annex A4: Photographs of the Public Consultation

Photo No.1– CKWD Interim GM explaining some points at public consultation meeting [18 August 2009]

Photo No.2 – City Planning Office representative raising a point at public consultation meeting [18 August 2009]

APPENDIX C:

DOCUMENTATION OF THE PUBLIC HEARING HELD ON 22 NOVEMBER 2012

Annex B

DOCUMENTATION OF PUBLIC CONSULTATION HELD ON NOVEMBER 22, 2012

Annex B1: Consultation Program

ADB TA 7122-PHI: WATER DISTRICT DEVELOPMENT SECTOR PROJECT (EXTENSION)
Public Consultation for the Validation of Social and Environment Safeguards Data for WDDSP(Ext)
City of Koronadal Water District
1st Blk., casa Subd., Barangay Zone 3, City of Korondal
November 22, 2012

Programme

9:00 - 9:15	Registration	Secretariat
9:15 - 9:20	Invocation	Dinah B. Songcog
9:20 - 9:25	Philippine National Anthem	Sound System
9:25 - 9:45	Introduction of Participants/ Welcome Address	GM Rey J. Vargas
9:45 - 10:00	Presentation of Proposed Water Supply Project in City of Koronadal	Genelyn E. Caballo
10:00 - 10:30	Open Forum	Genelyn E. Caballo
10:30 - 10:45	Presentation of Proposed Sanitation Development Plan	Nyrh Cabance
10:45 - 11:15	Open Forum	Genelyn E. Caballo
11:15 - 11:45	Break	Snacks
11:45	Closing Remarks	Genelyn E. Caballo

Annex B2: Attendance Sheet

ADB TA 7122-PHI: WATER DISTRICT DEVELOPMENT SECTOR PROJECT (EXTENSION)

Public Consultation for the Validation of Social and Environment Safeguards Data for WDDSP (Extension)

ATTENDANCE SHEET
City of Koronadal, 22 November 2012

	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBER/S & EMAIL ADDRESS	SIGNATURE
1	Ruben L. Valderama	Unified Toda Secretary	09196606666	
2	JOSELITO D. KEE	BRGY. TOPLAND	09069188140	
3	Myrna S. Abonito	Concepcion Women Ass. Brgy Concepcion	09285962443	
4	FRANCO M. BALETE Jr.	PUROK MEGALAND	09057631183	
5	TRIEZL L. PORTES	Purok megaland Carpenter Hill Kor City	0905 878 5995	
6	RUEL U. ARTK	COUNCILOR. BRGY. SARAVIA	09095515012	
7	EDWIN B. TIONGCO	PUROK MEGALAND	228-10-32	
8	MILBORN H. NOMBRE	PRK. BAGONG SIKAT GPS	09426493931	
9	Apryl Nicole B. Roque	Prk. Bagong Sikat, City of Koronadal / Student	09467454469	
10	Nila S. Dotz	Barangay Hill Carpenter Megaland	09494939548	

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	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBER/S & EMAIL ADDRESS	SIGNATURE
11	EUFEMIA P. ARGAL	Barangay Carpenter Hill PUROK MEGA LAND - member		
12	NOLAN H. de DIOS	PRK. MEGALAND SUB (MEMBER) BRGY. CARPENTER HILL KOR. CITY.		
13	SAMUEL B. VELARDE	BRGY. CAPTAIN PARAISO		
14	Rolando B. JOAQUINO	Punong Brgy. Brgy. Concepcion	09108631357	
15	Nenita B. Monegro	MHA - Secretary	09168948608	
16	Ester Gordiones	Brgy. Carpenter Hill - Kor. City	09089232481	
17	Linda Hahavora	Brgy. Carpenter Hil	09286998000	
18	Mary Jean H. Jamora	Prk. Silang, Brgy. Carpenter Hill, K.C	09999923635	
19	BALTAZAR M. ELEUTERIO	MEGALAND SUBD. CARPENTER Hill	09378688727	
20	ELIZABETH CASTILLANO	Megaland Sub. Carpenter Hill	09122574336	
21	Janelee S. de Dios	Megaland, Subd. Carpenter Hill	09208383741	
22	DOMINADOR F. ANITEN JR	MEGALAND, SUBD. CARPENTER Hill	09327322578	
23	DAVID V. MANGISER	B/KAGAWAD B/CONCEPCION	09391796448	

	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBER/S & EMAIL ADDRESS	SIGNATURE
24	GREGORIO O. PRESGA	BRGY CAPTAIN SAAVIA PD	09399021793	
25	DINAH B. SONGCOG	CKWD	09155276208	
26	MARL F. MANABE	BRGY. TAMPAKAN	09207498424	
27	IVAN N. PADILLA	BRGY. GPS	09051081938	
28	JOSEPHINE J. CAVEP	CKWD. GAD	09238763142	
29	ANGELIE GUADALUPE	CKWD	09088214904	
30	MAY ANN M. SANTOS	CKWD- GAD	09395454299	
31	GENELYN E. CABALLO	CKWD -	09226999637	
32	REY U. VARGAS	CKWD - GM		
33	REXCI CALLAN	CKWD		
34	Louise Mycee R. Sucado	Brgy. San Jose		
35	R. BUENDIA	PARAISO		
36	Randy L. Benedicto	Mega Land Subd.	09128696743	

37. Nyrh Cabane

Annex B3: Questions and Responses

Public Consultation for the Validation of Social and Environment Safeguards Data for WDDSP (Extension)

City of Koronadal Water District
1st Block, Casa Subdivision, Barangay Zone 3, City of Koronadal
November 22, 2012

WATER SUPPLY DEVELOPMENT PLAN

Name / Organization	Question	Response
Hon. Rogelio B. Joquino - Brgy. Captain, Brgy. Concepcion	When did you first learn about the proposed project and what were your initial reactions to it?	Brgy. Chairman Joquino replied that they were already aware of the proposed project and they had been expecting its implementation since then. He clarified that their barangay has recorded 954 households and out of that, more or less 60% expressed their intention to avail of the water service connections.
Hon. Samuel B. Velarde -Brgy. Captain, Brgy. Paraiso	When did you first learn about the proposed project and what were your initial reactions to it?	Brgy. Chairman Velarde said that when he learned about the proposed project he was so glad and thankful especially that the proposed (1) one ha. sanitary landfill is located in their area. As of this consultation date, he has already expressed his full support to the project.
Megaland Home Owner's Association **-** Brgy. Carpenter Hill	When did you first learn about the proposed project and what were your initial reactions to it?	One of the members of Megaland Home Owner's Association commented that the proposed project is only intended for five barangays and they are not part of it. GM Rey J. Vargas said that actually there is an on-going expansion in their area and probably they can avail ahead than the proposed benefactors.
Hon. Gregorio O. Presga - Brgy. Captain, Brgy. Saravia	Does the local people support the proposed project?	Brgy. Chairman Presga said that for him, he can always give his full support to the project and although they have springs in their area, his constituents still need the services of CKWD.
Joselito D. Kee - Brgy. Topland	Does the local people support the proposed project?	Mr. Joselito Kee of Brgy. Topland said that the constituents will surely support the proposed project. Out of 2,651 recorded households in his barangay, 30% is expected to avail of the new service connections of CKWD.

Name / Organization	Question	Response
Rogelio B. Joquino - Brgy. Captain, Brgy., Concepcion	Does the local people support the proposed project?	Brgy. Chairman Joquino commented that they will always support the proposed project because it is for the good of his constituents. He then asks GM Vargas if it is possible to go down to their area and conduct a public consultation so that all issues and concerns will be settled before its implementation. GM Vargas acknowledged and noted the above suggestion.
Participants	Any critical issue or concern by the local people regarding the project?	Majority of the participants said that as of date they have no critical issue yet, instead they are asking for a public consultation in their respective barangays though they knew that water will be chlorinated, still they had expressed their interests.
None	Are there employment opportunities in the project?	No Queries/Response
Joselito D. Kee - Brgy. Topland	Any loss of residential or commercial structures due to the project?	Mr. Joselito Kee of Brgy. Topland expressed his concern about the area for pump stations. Will CKWD purchase a land or will ask donations from the barangays. GM Rey Vargas answered the query, he said that in his discussion with the ADB consultants there was no budget for land acquisition that's why CKWD would like to ask at least 350sq. m from the barangay and if possible it is within the barangay hall compound for safety reasons. But in the event that the barangay cannot provide, CKWD will find ways to purchase its own land for pump stations. GM Vargas also added that once the project is installed it will remain forever. Ms. Caballo also added that as much as possible CKWD would like to utilize public property or public road only.
Hon. Rogelio B. Joquino -Brgy. Captain, Brgy Concepcion	Any loss of residential or commercial structures due to the project?	Brgy. Captain Joquino query on the preferred location for pump stations, is it along the road or could be anywhere? GM Vargas said that it could be anywhere as long as there's an access to road so that repairs and maintenance of equipments will be easy.
Participants	Any loss of Community life (like market place, public playground) or	The participants commented that if ever there will have such instances, they will find ways to settle it.

Name / Organization	Question	Response
	community activities that will be affected?	
Hon. Samuel B. Velarde -Brgy., Chairman, Barangay Paraiso	Would there be land acquisition that would result in resettlement, or would affect parks, forest, etc.?	Brgy. Chairman Velarde query if we already have an exact location of deepwells. Ms. Genelyn E. Caballo said that there's no specific area yet but a deepwell will be installed in each of the 5 barangays. He also queried on the distance where a deepwell should be positioned so that a domestic pump or pitcher pump will not be affected during the operation of the project. GM Vargas said that usually a domestic pump is positioned at 12m deep while a deepwell reaches at about 70-120m deep. This means that the shallow well would not be affected when the deepwell is operated. He also added that the upper portion of the water level is already contaminated or polluted.
Ruben L. Valderama - Unified Toda Operator's & Driver's Association	Would there be land acquisition that would result in resettlement, or would affect parks, forest, etc.?	Mr. Valderama query, what if a pipeline going to households passes thru their area and caused some damaged in their properties, will they be compensated? GM Vargas said that if ever such instance happens, CKWD will facilitate for the resettlement or relocation if necessary but rest assured that any destruction done will be rehabilitated and compensated.
None	Will the project location adversely affect water resources?	No queries/comments
Participants	Any other issues you want to share (security, cooperation from local communities)	Majority of the participants assured peace and order in their respective barangays

Prepared by: DINAH B. SONGCOG
Documenter

Annex B4: Photographs of the Consultation

Photo 1. The General Manager of the City of Koronadal Water District (CKWD), Rey Vargas, making the presentation on the proposed water supply subproject during a public consultation held on Nov. 22, 2012.

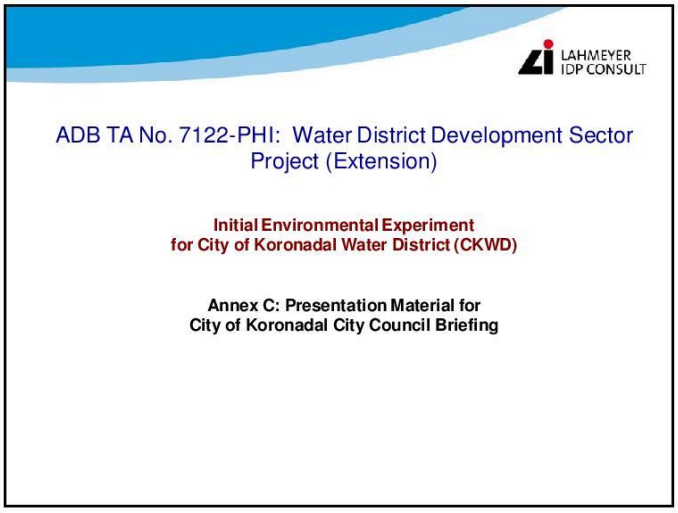
Photo 2. Representatives of various barangays of the City of Koronadal listen to the CKWD GM as he presents the water supply subproject.

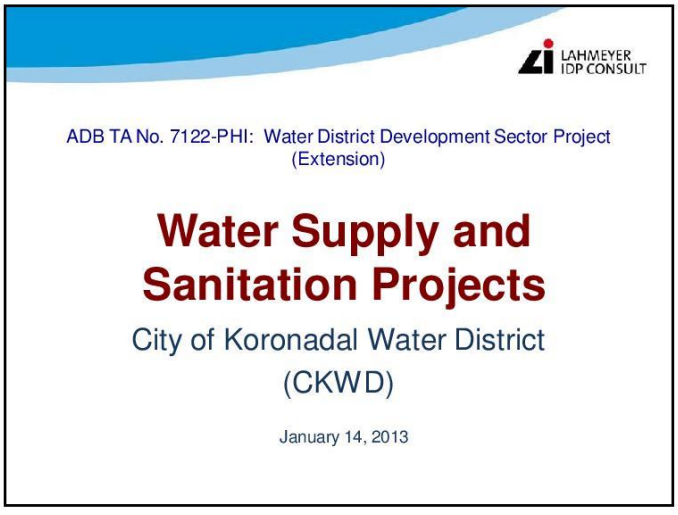
Photo 3. Joselito Kee of Brgy. Topland makes a comment on the proposed water supply project of CKWD.

APPENDIX D:

PRESENTATION MATERIALS USED IN THE BRIEFING OF THE CITY OF KORONADAL COUNCIL

2/28/2013





2/28/2013

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2 Proposed Development Plans of CKWD

1. Water Supply Development Plan
2. Sanitation Development Plan

LAHMEYER IDP CONSULT

Water Supply Development Plan

2/28/2013

LAHMEYER IDP CONSULT

Objective of water supply development plan

- Expand CKWD's service by developing separate water supply system in each of the 5 barangays not yet included in CKWD's service area.

Implementation

1. The recommended plan will be implemented independent of the on-going projects of CKWD.
2. The recommended plan is expected to be completed by Year 2014.

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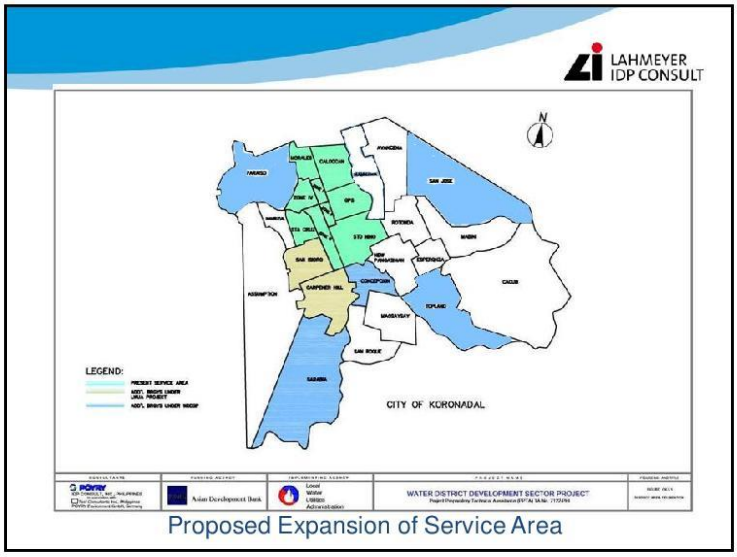
Major Project Components

1. Deepwells in Brgys. Concepcion, Paraiso, San Jose, Sarabia, and Topland each with pump facilities, hypochlorinator and stand-by generator set;
2. 100 cu. m. elevated steel storage tank for each pump station;
3. 29.15 km of pipelines for 2,707 new service connections;
4. 350 sq. m. lot for each tank and pump station.
5. Total development cost is P86.11 million

2/28/2013



Proposed Expansion of Service Area

Operational Pump Facility

2/28/2013

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Additional Service Connections in One Year

Barangay	No. of Service Connections
Concepcion	339
Paraiso	472
San Jose	647
Sarabia	562
Topland	687
Total	2,707

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Sanitation Development Plan

2/28/2013

Definitions

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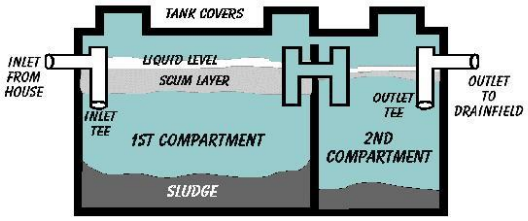
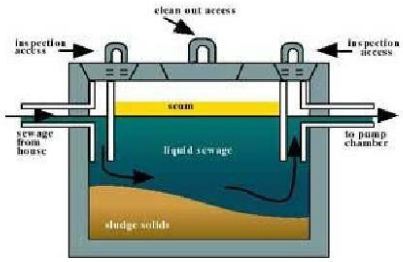
- Septic Tank – a watertight, multi-chambered tank where sewage is partially decomposed by anaerobic bacteria. Solids settle to the bottom allowing the clarified effluent to flow out of the tank for further treatment.



Definitions

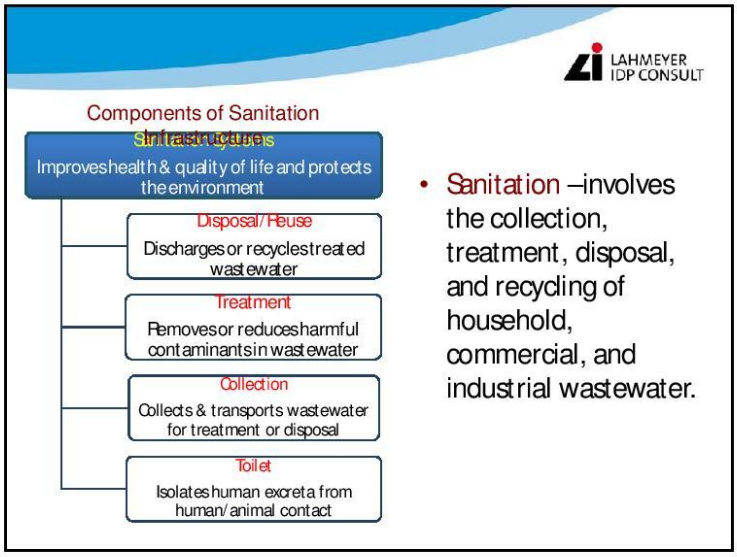
LAHMEYER IDP CONSULT

- Sewage – wastewater, particularly from toilets, but also from kitchens, laundry areas and sinks.



- Septage – combination of scum, sludge and liquid that accumulates in septic tanks.

2/28/2013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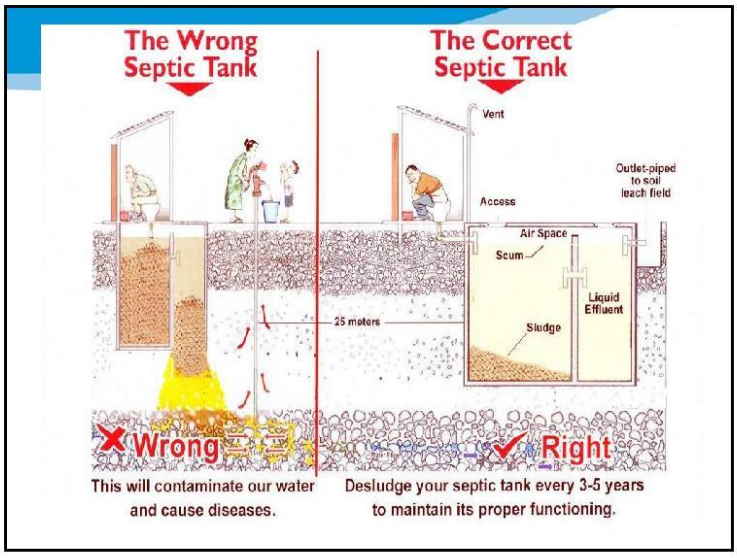
Components of Sanitation
Sanitation Systems
Improves health & quality of life and protects the environment
Disposal/Reuse
Discharges or recycles treated wastewater
Treatment
Removes or reduces harmful contaminants in wastewater
Collection
Collects & transports wastewater for treatment or disposal
Toilet
Isolates human excreta from human/animal contact
• Sanitation –involves the collection, treatment, disposal, and recycling of household, commercial, and industrial wastewater.


The Wrong Septic Tank
The Correct Septic Tank
Vent
Outlet-piped to soil leach field
Access
Air Space
Scum
Liquid Effluent
Sludge
25 meters
Wrong
Right
This will contaminate our water and cause diseases.
Desludge your septic tank every 3-5 years to maintain its proper functioning.

2/28/2013

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Cases of Diarrhea

Year	Ave 2005-2009	2010	2011
Cases	1,356	1,596	1,844
Approx. Rate	8.4 cases/1,000	9.6 cases/1,000	10.8 cases/1,000

Source: Koronadal City Health Office, 2012

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Objectives of sanitation development plan

1. Provide an appropriate collection, treatment and disposal system for domestic wastewater.
2. The recommended program is designed to meet the treatment requirements for Year 2025.
3. The program will be implemented in two phases.

2/28/2013

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Implementation Program

Phase I (2013-2015)

1. Issuance and enforcement of city ordinance on proper design of septic tank and requiring regular desludging of septic tanks.
2. Conducting information drive on proper sanitation.
3. Inspection and repair of septic tanks.

Phase II (2016-2018)

1. Construction of septage treatment facility (SpTF).
2. Procurement of vacuum trucks, and desludging of septic tanks.
3. Operation and maintenance of the SpTF.

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Sanitation Ordinance

- A sanitation ordinance provides the framework on how to manage wastewater generated by public and private sources. It also provides the guidelines to private operators who would like to engage in the business of wastewater collection, treatment and disposal.

2/28/2013

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Requirements and Contents of a Sanitation Ordinance

- Legal Basis, Scope, and Authority
- Definition of Terms
- Technical Provisions (Description of the Septage Management System
- Design, Operation, and Maintenance, Septic Tanks – design and construction
- Requirements, Desludging Procedures, Septage Treatment Facility
- Administration and Enforcement (Institutional Arrangements, Monitoring and Evaluation, Finances and User Fees, Administrative Procedures)

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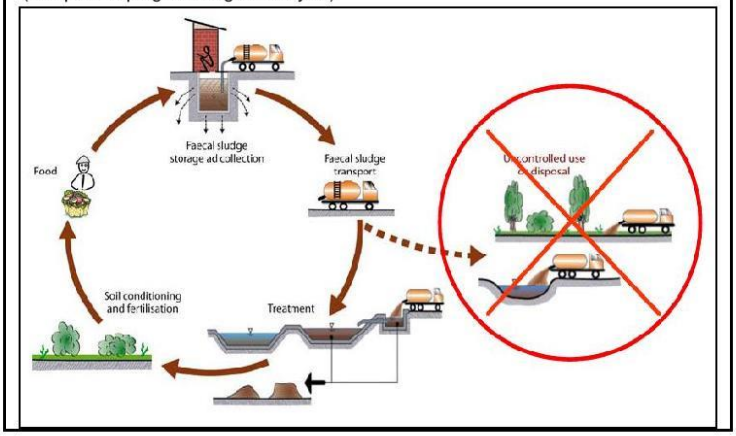
Components of a septage management system

(complete septage management cycle)



2/28/2013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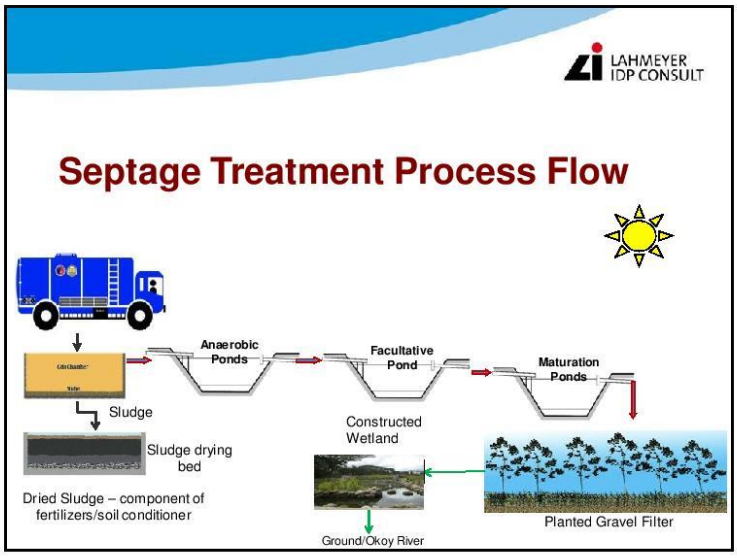
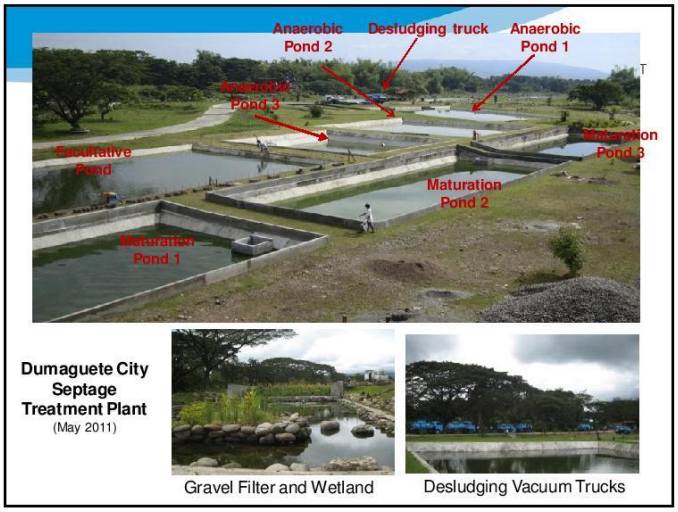
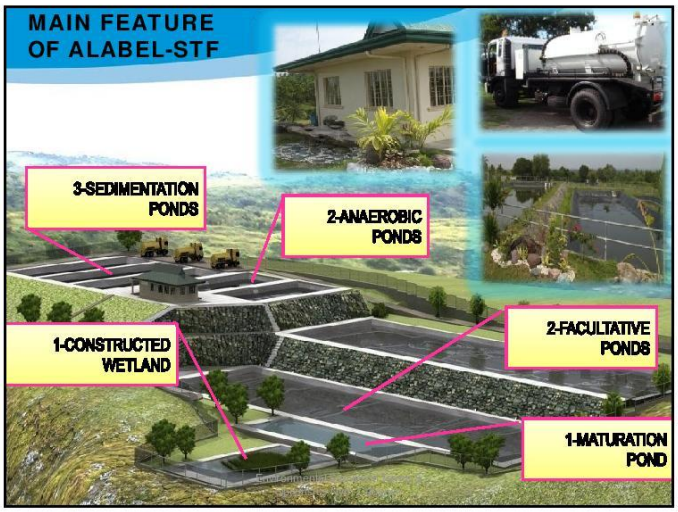
Septage Management
2. Transport
3. Treatment
1. Desludging


LAHMEYER IDP CONSULT
Septage Treatment Process Flow
Anaerobic Ponds
Facultative Pond
Maturation Ponds
Sludge
Sludge drying bed
Dried Sludge – component of fertilizers/soil conditioner
Constructed Wetland
Planted Gravel Filter
Ground/Okoy River

2/28/2013


Anaerobic Pond 2
Desludging truck
Anaerobic Pond 1
Anaerobic Pond 3
Facultative Pond
Maturation Pond 3
Maturation Pond 2
Maturation Pond 1
Dumaguete City Septage Treatment Plant
(May 2011)
Gravel Filter and Wetland
Desludging Vacuum Trucks


MAIN FEATURE OF ALABEL-STF
3-SEDIMENTATION PONDS
2-ANAEROBIC PONDS
1-CONSTRUCTED WETLAND
2-FACULTATIVE PONDS
1-MATURATION POND

2/28/2013

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Total Development Cost

Components	Amount (PhP)
Basic construction cost	27.50M
Capacity building cost	1.72M
Land acquisition	2.55M
Detailed engineering design	2.94M
Vacuum trucks	9.00M
Physical contingency	9.85M
Price contingency	11.06M
Supervision	1.96M
Total	**66.58M**

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Financing Plan for the Sanitation Project & Fund Source

- ADB Loan : PhP58.49 million
- WD Equity : 8.09 million

Total : PhP66.58 million

APPENDIX E:

SAMPLE GRIEVANCE REDRESS FORM

The _____Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date		**Place of Registration**			
Contact Information/Personal Details					
Name		**Gender**	* Male * Female	**Age**	
Home Address					
Place					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where, and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)	
Mode of communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/Positions of Officials Reviewing Grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	