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**National Water Harvesting and Storage Authority**


**STANDARD OPERATING**

**PROCEDURES**

**FOR**

**TECHNICAL PLANNING AND  
DESIGN DEPARTMENT**


**NWHSA/TPD/SOP/01**

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**Document Review Sheet**


These Standard operating Procedures will be reviewed from time to time.

Action	Name & Signature	Position	Date

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## 1.0 AMENDMENT RECORD

This document is reviewed regularly to ensure relevance to the systems and processes that it defines. A record of contextual additions or omissions is given below.

### 1.1 Amendment Record Sheet

Amendment Date	Issue No.	Revision No.	Page No.	Subject Of Review /Modification	Revised By	Reviewed & Approved By

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## 1.2 DEPARTMENT OVERVIEW

### 1.2.1 The Function of the Technical Planning and Design Department

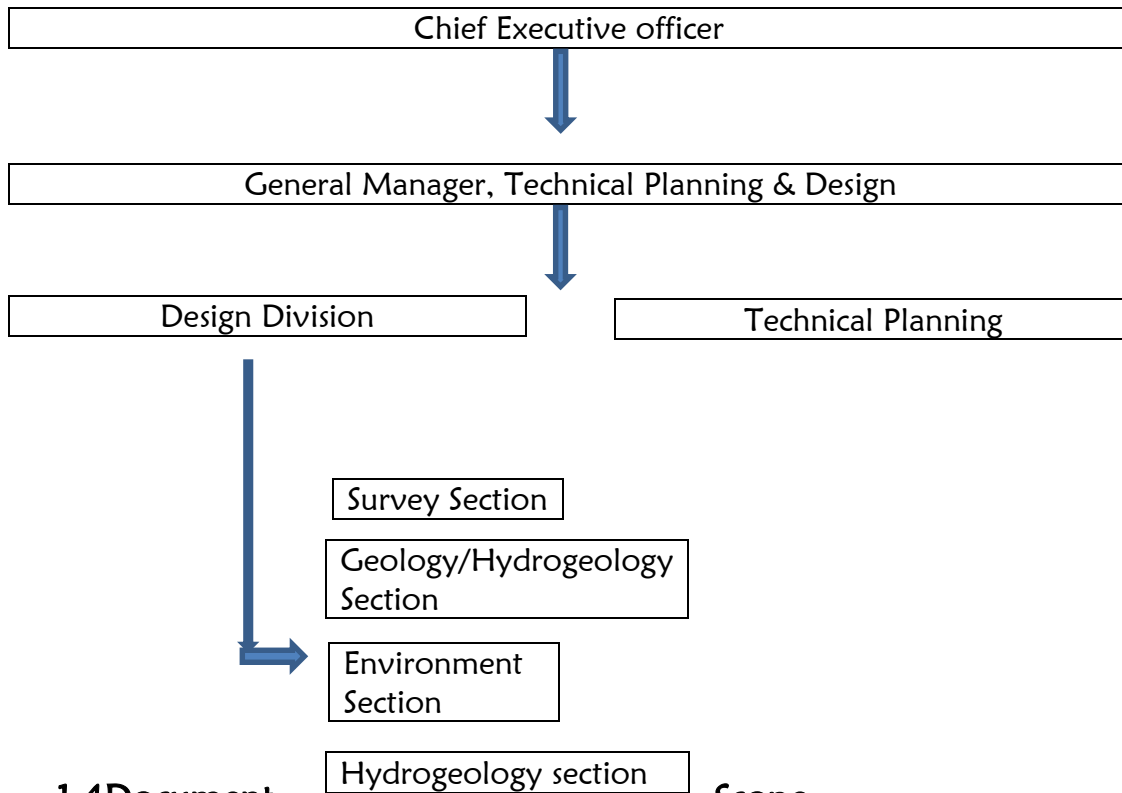
The function of the Department is to plan and carry out Designs and Environmental & Social impact Assessment of projects to be implemented by the Authority.

### 1.3 Administrative Structure

The Technical Planning and Design Department has the following Divisions/Sections/functions


- Design Division
- Technical Planning Division
- Survey Section
- Environment Section
- Geology/Hydrogeological Section
- Hydrology Section

The Administrative Structure of the Department is as follows here below:



1.4 Document

Scope

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This Document covers all the processes in the Technical Panning and Design Department as indicated here under:

#### **1.4.1 Processes in Design Division**

- The Procedure for Design of large dams
- The Procedure for Design of small dams and Flood control structures

#### **1.4.2 Process in Survey Section**

- The Procedure for carrying out Survey

#### **1.4.3 Processes in Environment Section**

- The Procedure for Carrying out ESIA study for large dams
- The Procedure for Carrying out summary project report for small dams/pans, Flood control and Boreholes


#### **1.4.4 Processes in Geology/Geotechnical Section**

- The Procedure for carrying out Hydro geological survey
- The Procedure in carrying out Geophysical Survey

#### **1.4.5 Processes in Hydrology Section**

- The procedure for Carrying out Hydrological studies



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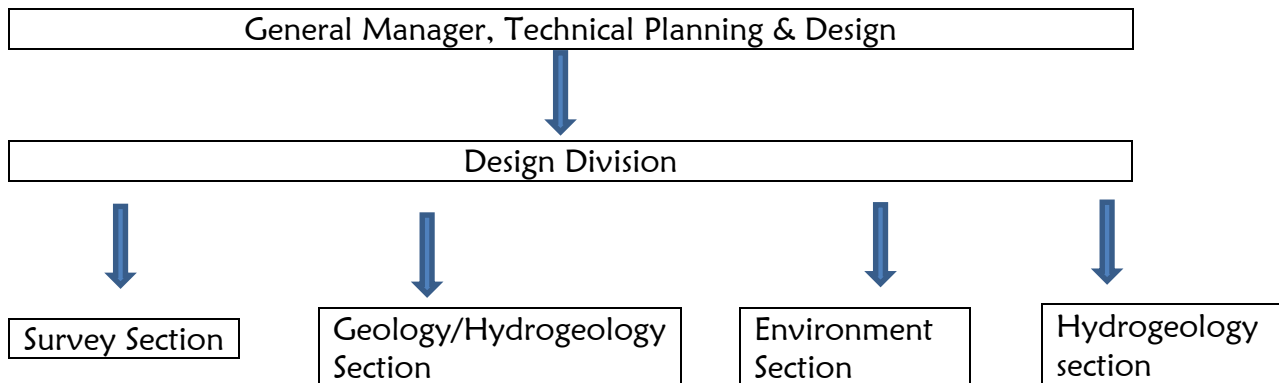
## 2.0 THE PROCESSES

### 2.1 DESIGN DIVISION

#### 2.1.1 General Overview

The function of Design Division is to ensure all the projects are effectively designed within the stipulated timelines.

#### 2.1.2 Administrative Structure of Design Division



#### 2.1.3 Processes in Design Division

The Processes in this Division are:


- The Procedure for Design of large dams
- The Procedure for Design of small dams and Flood control structures

#### 2.1.4 Purpose

The purpose of these procedures is to ensure that the authority selects the best project alternatives, produces accurate and cost-effective project designs which ensure project sustainability and customer satisfaction.


#### 2.1.5 Scope

This SOP is applicable to all the Medium/Large dam projects under the Authority's jurisdiction.

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## 2.1.6 References

- Practice Manual for Small Dams, Pans and other Conservation Structures in Kenya MWSI 2nd Edition 2015.
- Guidelines for the Design Construction & rehabilitation of Small Pans & Dams in Kenya, Kenya –Belgium Water Development Programme, Nairobi, June 1992
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- (2013). Design Standards No. 13 Embankment Dams. U.S. Department of the Interior Bureau of Reclamation (USBR).
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- (1995). EM 1110-2-1806 Earthquake Design and Evaluation for Civil Works Projects. U.S. Army Corps of Engineers. (1970). EM 1110-2-1906 Engineering Design and Laboratory Soil Testing. U.S. Army Corps of Engineers.
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- Eurocode 2 Design of Concrete Structures. The British Standards Institution.
- (1998). Guidelines for Design of Dams for Earthquake. Australian National Committee on Large Dams (ANCOLD). (2014). KS 573: 2014 High yield steel bars for the reinforcement of concrete — Specification. Kenya Bureau of

#### **Standards.**

- Loupekine, I. (1971). Seismic Zoning Map of Kenya (Kenya Earthquake Code 1973).
- Practice Manual for Water Supply Services in Kenya. (2005). Nairobi: Ministry of Water and Irrigation.
- United states department of the interior bureau of reclamation (usbr). (1987). design of small
- Dams. United States Department of the Interior Bureau of Reclamation (USBR).

### **2.1.7 List of abbreviations**

CEO	Chief Executive Officer
GMTPD	General Manager, Technical Planning and Design
TOR	Terms of Reference
RFP	Request for Proposals
NEMA	National Environment Management Authority
ESIA	Environmental and Social Impact Assessment
HDD	Head of Design Division
PE	Project Engineer
PDR	Preliminary Design Report
FDR	Final Design Report
Board	NWHSa Board of Directors
GoK	Government of Kenya

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HoD                    of Department  
MWSI                Ministry of Water, Sanitation and Irrigation  
MoPW                Ministry of Public Works

## **2.1.8 Definition of Terms**

### **2.1.8.1 Consultant**

This is a company, individual or organization employed or nominated by the Authority to assist in the performance of a particular job or the provision of professional services to any of the authority’s mandated roles.

### **2.1.8.2 Project Engineer**

The Authority’s representative responsible for detailed co-ordination of all parties involved and activities in a project, including document control management regarding the project.

#### **Project/Design team**

A team headed by PE and consisting of other members of professionals relevant in the design process eg. Surveyors, environment, Hydrologists etc

### **2.1.8.3 Review**


A formal documented comprehensive and systematic examination of a package to evaluate the requirements and the capability of the design to meet those requirements and to identify problems and propose solutions. Also refers to checking of a technical document by a person other than the person who prepared it, in order to ensure its consistency and its compliance with the design input

### **2.1.8.4 Project/Design team**

A team headed by PE and consisting of other members of professionals relevant in the design process eg. Surveyors, environment, Hydrologists etc

### **2.1.8.5 Checking**

This refers to checking of a technical document by a person other than the person who prepared it, in order to ensure its consistency and its compliance with the design input

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### 2.1.8.6 Pre- feasibility Study

Prefeasibility study is an early-stage analysis of a potential of project conducted by a small team. It proceeds a feasibility study and investigates if a concept satisfies the clients objectives.

### 2.1.8.7 Feasibility Study

A feasibility study is a study done in order to assess the viability of a project and provide a report enumerating the findings, conclusions and recommendations regarding the project.

### 2.1.8.8 Preliminary Design

This is the first phase of the design process which defines the design parameters and lays out the overall design. It is in this stage where the appointed Project team holds meetings with beneficiaries for information gathering.

The users communicate specific needs/requirements and the design team conducts field investigations regarding the layout of the existing areas in question. The design team collects relevant information and generates designs on the project information.

The designs are then reviewed by all the stakeholders and refined accordingly.

### 2.1.8.9 Final/Detailed Design


The detailed design provides a comprehensive description of the works, which allows construction documents to be produced. The construction documents include the following: -

- The general drawings (includes the location of the project (route map), contours, existing structures if any, ancillaries),
- The plan drawing
- Sections of the project components,
- Specifications,
- Bills of quantities
- Estimated cost of implementation
- Design report

### 2.1.8.10 Customer

This means: -

- County Governments
- GoK institutions,

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- Private individuals or Firms.
- Community

### **2.1.9 Responsibility**

The GMTPD is responsible for developing, maintaining and recommending changes to this procedure.

### **2.1.10 Standard Operating Procedure for Design of Large dams - NWHSA/TPD/SOP/01/LD**

#### **2.1.10.1 Source of input**


- Counties,
- Government Ministries and Institutions,
- Individuals, Private Firms or
- NWHSA
- Community
- NWHSA departments

#### **2.1.10.2 Required inputs**

- Personnel
- Finances
- Equipment
- Time
- Requests/Proposals from Counties,
- Requests from Government Institutions,
- Requests from Individuals, Private Firms or
- Requests from communities
- NWHSA Proposals
- National Water Master Plan

#### **2.1.10.3 Expected outputs**


- Lists of projects
- Pre- feasibility study reports
- Project Concept Notes
- Feasibility study reports
- Preliminary design reports

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- Final design reports
- Approved Budgets
- Appointment letters
- Request for proposals

#### 2.1.10.4 Customers


- Construction department
- Procurement Division
- Staff in TPD

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### 2.1.10.5 Process details

No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
1.	NWHSA may receive Requests from the Counties, other Government institutions, individuals, private firms or NWHSA may also come up with other projects may be selected from the National Water Master Plan in line with the Vision 2030 and the Sustainable Development Goals.	Personnel	GMTPD, CEO	As and when they come	Projects to be designed	List of projects
2.	The GMTPD shall appoint a team to carry out a prefeasibility study	Equipment – Laptops, Stationary Personnel	GMTPD	2 days	Pre-feasibility study Team	Letter of appointment
3.	The team shall undertake a desk study	Personnel Equipment – Laptops, Stationary Desk study documents	Team Leader	7 days	Desk study report	Desk study report
4	The team shall prepare the budget for site identification visit which will be approved, Processed and paid by the management.	Equipment – Laptops, Stationary etc	Team Leader	2 days	Finances	Approved Budget Approved Imprests Payment documents




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No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
	<b>Is budget approved and facilitation done?</b>					
5	The team shall undertake a site visit to the project area and take the necessary information regarding the project site for preparation of the pre-feasibility study	Personnel Finances Equipment Desk study report	Team leader/Team	5-15 days	Data for prefeasibility study	Field work report
6	Upon completion of the site visit the team shall then prepare a Pre-feasibility Study Report to be submitted to GMTPD/appointed team for review and approval.	Equipment – Laptops, Stationary etc Site data	Team leader/Team	5 days	Approved Pre-feasibility study report	Memo forwarding the prefeasibility report to the GMTPD
	<b>Is the pre- feasibility study approved?</b>					For review and approval
7	The team will prepare concept notes for the project in question	Equipment – Laptops, Stationary etc	Team leader/Team	5 Days	Approved Project Concept Notes	Memo forwarding the concept note to the GMTPD for review and approval

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No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
8	After the pre-feasibility study, the GMTPD shall determine if there is adequate internal expertise and resources available to undertake the project at hand, and shall advise the management whether there is need to outsource certain aspects of the professional input required to external consultants. The Management will make a decision.	Personnel Prefeasibility study report	GMTPD	2 days	MEC Resolution	MEC paper
	<b>Does the design require internal or external capacity</b>					
9	<b>Design using Internal capacity</b>					
9.1	The GMTPD shall constitute a Design team constituting a PE and other relevant professionals required in the design of the project	Equipment – Laptops, Stationary etc	GMTPD	2 days	Appointed Team	Appointment letter
9.2	The Design team under the supervision of the PE will undertake the project feasibility	Personnel Finances Equipment Survey report, Hydrology report, Geological report, ESIA scoping report	PE	6 months - 18 months	Feasibility study report	Minutes of team meetings

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No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
9.3	The GMTPD will constitute a review team to review the design reports at the feasibility, Preliminary and final Design milestones.	Equipment – Laptops, Stationary Reports	GMTPD	2 weeks per document	Approved Feasibility, Preliminary, Final design	Review notes and comments
	<b>Is the project feasible?</b>					
9.4	The Design team will proceed to Preliminary Design	Personnel Finances Equipment	PE	6 months - 18 months	Approved Preliminary design	Review notes and comments
	<b>Is the Preliminary Design report approved by the project review team?</b>					
9.5	The Design team will proceed to Final Design	Personnel Finances Equipment	PE	6 months - 18 months	Approved Final design	Review notes and comments
	<b>Is the Final Design report review approved by the project review team?</b>					
9.6	Final design Forwarded to Construction for implementation	Equipment – Laptops, Stationary etc	GMTPD	2 days	Designs in construction department	Memo forwarding designs
10	<b>Design using external capacity</b>					
10.1	If the project requires external expertise, The GMTPD will appoint a team constituting a PE and other relevant professionals to supervise the Consultants.	Personnel Equipment – Laptops, Stationary etc	GMTPD	2 days	Team	Appointment letter

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No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
10.2	The team in consultation with the GMTPD and HDD shall prepare the Terms of Reference (RFP) for the tendering of the proposed project using the pre-feasibility study prepared earlier.	Personnel Equipment – Laptops, Stationary Pre-feasibility study report	GMTPD, HDD, PE	10 days	RFP	TOR
10.3	The Procurement and Legal Departments will procure and sign the Consultant	Equipment – Laptops, Stationary etc	CPO/CLO		Approved contract	Signed contract
10.4	The GMTPD will hold a kick off meeting with the Consultant and discuss issues to do with availability of staff, methodology, expectations, timelines etc	Equipment – Laptops, Stationary, venue etc	GMTPD	5 days	Resolut ions/ag reemen ts/Conc ensus/c larificat ions	Minutes of meeting Attenda nce list
10.5	After the kick off meeting, the consultant shall prepare and forward to NWHSA an inception report to the specifications in the RFP and within the time stipulated in the contract.	Equipment – Laptops, Stationary, venue etc	PE	14 days	Incepti on report	Letter forward ing Inceptio n report
10.6	The GMTPD will constitute a review team to review the design reports at the inception, feasibility, Preliminary and final Design milestones.	Equipment – Laptops, Stationary etc	GMTPD	2 weeks per document	Appro ved docum ents	Review notes and comme nts

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No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
	<b>Is the inception report approved?</b>					
10.7.	After the approval of the Inception report, the consultant will carry out the Feasibility study	Personnel Finances Equipment	PE	6 months - 18 months	Feasibility study	Memo forwarding the Feasibility study report
	<b>Is the project feasible?</b>					
10.8	The Design team will proceed to Preliminary Design	Personnel Finances Equipment	PE	6 months - 18 months	Approved PDR	Memo forwarding the PDR
	<b>Is the Preliminary Design report approved by the project review team?</b>					
10.11	The Design team will proceed to Final Design	Personnel Finances Equipment	PE	6 months - 18 months	Approved FDR	Memo forwarding the FDR
	<b>Is the Final Design report review approved by the project review team?</b>					
10.12	Forwarded to Construction for implementation	Equipment – Laptops, Stationary etc	GMTPD	2 days	Designs in construction department	Memo forwarding designs

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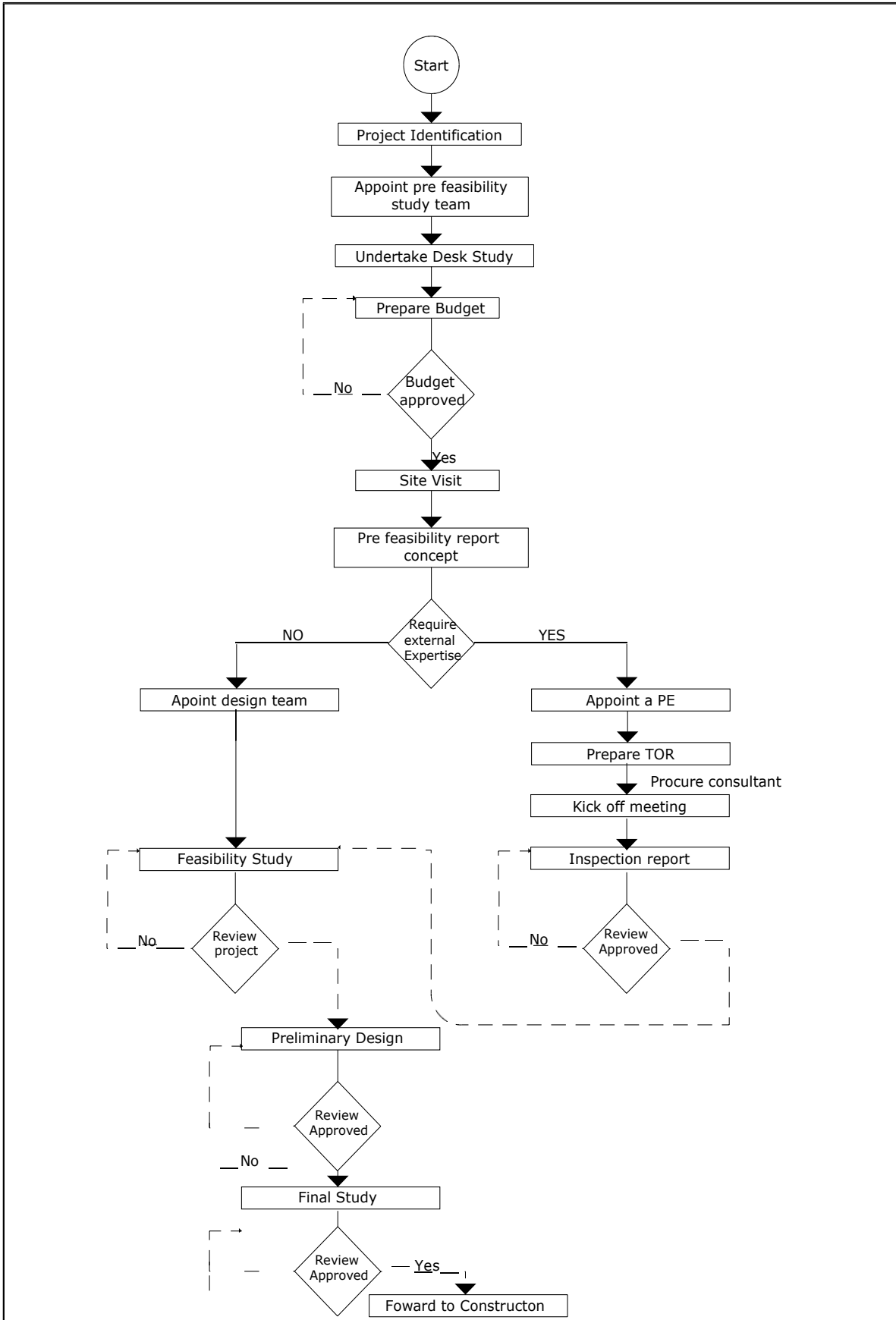
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## 2.1.11 Standard Operating Procedure for Design of Small Dams, Pans and Flood Control Structures- NWHSA/TPD/SOP/01/SD & FC

### 2.1.11.1 Source of input

- Counties,
- Government Ministries and Institutions,
- Individuals, Private Firms or
- NWHSA
- Community
- NWHSA departments

### 2.1.11.2 Required inputs

- Personnel
- Finances
- Equipment
- Time
- Requests/Proposals from Counties,
- Requests from Government Institutions,
- Requests from Individuals, Private Firms or
- Requests from communities
- NWHSA Proposals


### 2.1.11.3 Expected outputs

- Lists of projects
- Feasibility study reports
- Final design reports
- Approved Budgets
- Appointment letters

### 2.1.11.4 Costumers


- Construction department
- Procurement Division
- Staff in TPD




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### 2.1.11.5 Process details

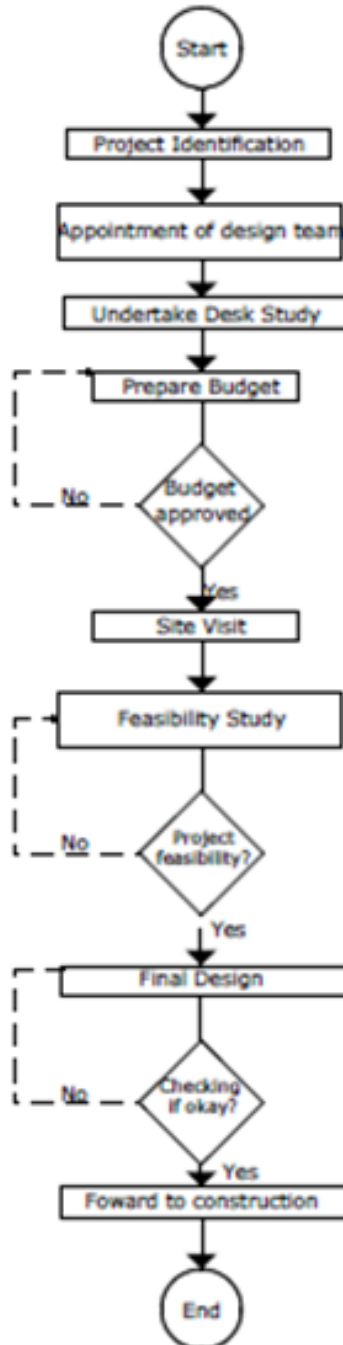
No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
1.	NWHSA may receive Requests from the Counties, other Government institutions, individuals, private firms or NWHSA may also come up with other projects may be selected from the National Water Master Plan in line with the Vision 2030 and the Sustainable Development Goals.	Personnel	GMTPD, CEO	As and when they come	List of projects	List of projects in place
2.	The GMTPD shall appoint a team to carry out a Feasibility study and Design	Equipment – Laptops, Stationary Personnel	GMTPD	2 days	Pre-feasibility study Team	Letter of appointment
3.	The team shall undertake a desk study	Personnel Equipment – Laptops, Stationary Desk study documents	Team Leader	7 days	Desk study report	Desk study report
4	The team shall prepare the budget for site identification visit which will be approved by the management.	Equipment – Laptops, Stationary etc	Team Leader	3 days	Budget	Approved Budget
	<b>Is budget approved and facilitation done?</b>					


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No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
5	The team shall undertake a site visit to the project area and take all necessary information regarding the project site.	Personnel Finances Equipment	Team leader/Team	5-15 days		
6	Upon completion of the site visit the team shall then prepare a feasibility study report	Equipment – Laptops, Stationary etc	Team leader/Team	5 days	Pre- feasibility study report	Pre-feasibility study report Memo forwarding the report to the GMTPD
	<b>Is the project feasible?</b>					
9.4	The Design team will proceed to final design.	Personnel Finances Equipment	PE	6 months - 18 months	Final design report	Final design report
	<b>Is the Final Design report review approved by the project review team?</b>					
9.4	Forwarded to Construction for implementation	Equipment – Laptops, Stationary etc	GMTPD	2 days	Designs in construction department	Memo forwarding designs

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### 2.1.11.6 Process flow Design of Small Dams, Pans and Flood Control Structures




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### 2.1.12 Records/Retained Documented Information

- Feasibility study reports
- Final design reports
- List of projects
- Approved Budgets
- Appointment letters
- Memos

### 2.1.13 Risks and Mitigations

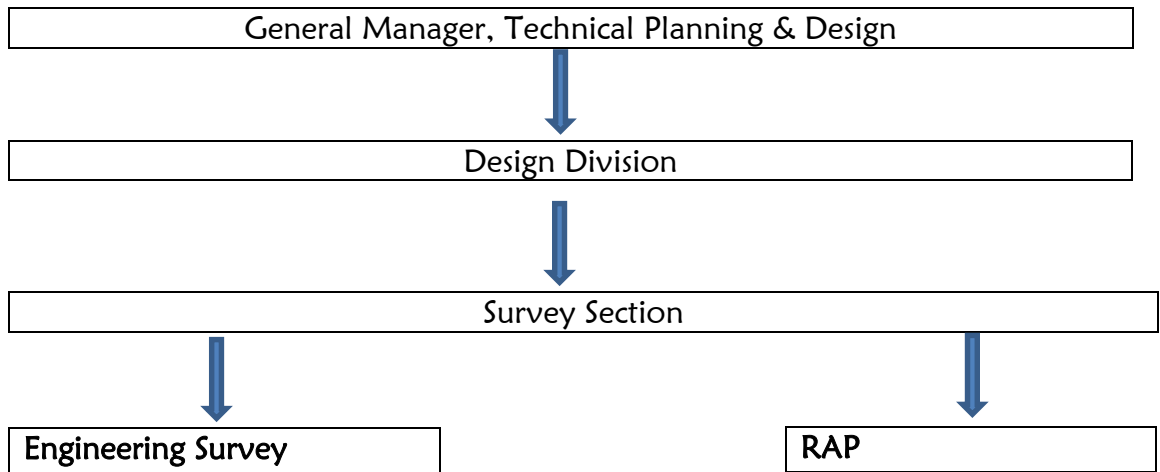
S/NO	RISK	MITIGATION
1	Scarcity of construction material	Have alternative supply of materials
3	Inadequacy of technical staff	Recruit technical staff Outsource technical staff
4	Over pricing of project costs and services	Use Engineers Estimate and market survey
5	Rejection of projects by community	Stakeholder involvement from inception to implementation

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### 2.2.1 General

The function of the Survey Section is to carry out Engineering Survey and RAP.

### 2.2.2 Administrative Structure for Survey Section



### 2.2.3 Processes in Survey Section

The process in survey section involves survey works of dams/pans, flood control works and other services

### 2.2.4 Purpose

The purpose of this procedure is to spell out guidelines for carrying out survey work in NWCPC operations which includes Dams/Pans, Flood control works and other services.


### 2.2.5 Scope

This procedure is applicable to all survey work carried out for NWCPC.

### 2.2.6 References

NWCPC Quality Manual, ISO 9001:2008 QMS Standard Requirements, Survey of Kenya Maps, Design Manual for Water Supplies in Kenya and LS.K. Practicing Guidelines for None Title Surveys, 2006

### 2.2.7 Definitions

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The following abbreviations have been used in the procedure:

CEO	Chief Executive Officer
GMPD	General Manager Planning and Design
HSD	Head of Survey Division
NWHSA	National Water Harvesting and Storage Division
I.S. K	Institution of Survey of Kenya
EDM	Electromagnetic Distance Measurement
GPS	Global Positioning System
KPI	Key Performance Indicators

### 2.2.8 Responsibility

It is the responsibility of the GMPD to ensure that during planning for projects, survey work is carried out for all new projects to be implemented in the Corporation in accordance to this procedure.

### 2.2.9 Standard Operating Procedure for Carrying out Engineering survey - NWHSA/TPD/SOP/01/SURV

#### 2.2.9.1 Source of input


- TPD Department
- Construction Department

#### 2.2.9.2 Required inputs

- Personnel
- Finances
- Equipment
- Time
- Requests from Planning and Construction department


#### 2.2.9.3 Expected outputs

- Pre- feasibility study reports
- Feasibility study reports
- Preliminary design reports
- Final design reports
- List of projects
- Approved Budgets
- Appointment letters
- Request for proposals

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#### 2.2.9.4 Customers


- Design section
- Construction Department

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### 2.2.9.5 Process details

No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
1	The General Manager Planning and Design shall in consultation with the Head of Survey Division establish the project that requires to be surveyed and provide the necessary resources required by a surveyor for carrying out survey work.	Personnel Field allowances	GMTPD, HSD	As and when required	Project Payment	Approved Budget
2	The HSD will appoint a surveyor to carry out the survey	Request from the GMTPD Personnel Computer Stationary	HSD		Surveyor to carry out the survey	Letter of appointment
3	The surveyor shall then carry out reconnaissance survey of the site conditions to familiarize with the conditions.	Transport Survey materials Survey Equipment	Surveyor	2 -5 days	Reconnaissance report	Reconnaissance report
4	The surveyor shall establish permanent control points	Personnel Survey materials Survey Equipment	Surveyor	2-10 days	Controls	Beacons
5	The surveyor shall then determine the observation method to be employed depending on nature of work.	Personnel	Surveyor	1 days	Method	Write up
6	The observed data shall be recorded in appropriate survey data forms for	Personnel Computer	Surveyor	2 days	Recorded data	Raw Data Record book



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No.	Process Details/Description	Resources/inputs	Responsibility	Timeline	Output	Measure of Success (KPI)
	subsequent processing.	Stationary				
7	Gathered data shall then be processed using appropriate data processing tools.	Personnel Equipment	Surveyor	5-15 days	Processed data	Raw data
8	The output of the data processing shall be presented in a format as stipulated in Design Manual & ISK Practical Guidelines for None Title Surveys.	Equipment – Laptops, Stationary etc	Surveyor	5-30 days	Survey report	Availability and understanding of Design Manual
9	The presented data shall then be submitted to Head of Survey division for approval and subsequent handover to General Manager Planning & Design for Design work to commence.	Personnel Stationary	Surveyor	1 day	Survey report forwarded	Forwarding letter



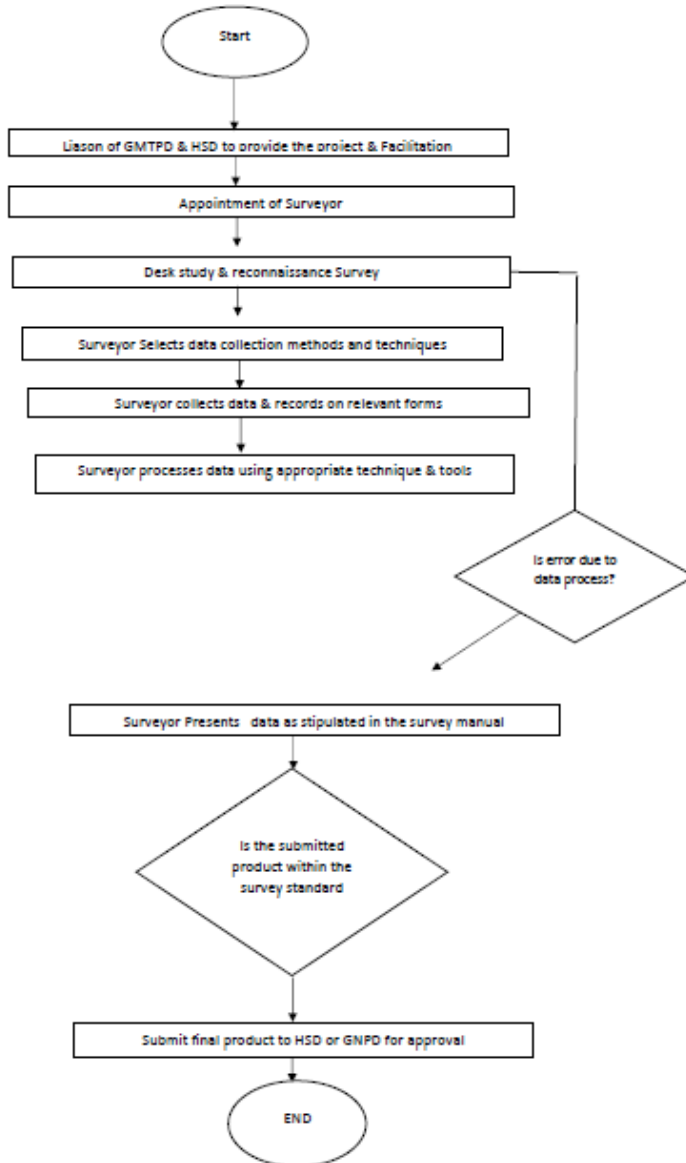
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### 2.2.10 Records

The following records shall be kept as evidence of implementation of this procedure

1. Tachy observations bookings
2. EDM survey bookings
3. Total station survey bookings
4. GPS survey & Differential bookings
5. Profile drawings
6. Topographic drawings
7. Reports from desk studies and field reconnaissance surveys

### 2.2.11 Risks and Mitigations

S/NO	RISK	MITIGATION
1	Use of faulty survey equipment	Regular calibration of the equipment
2		
3		

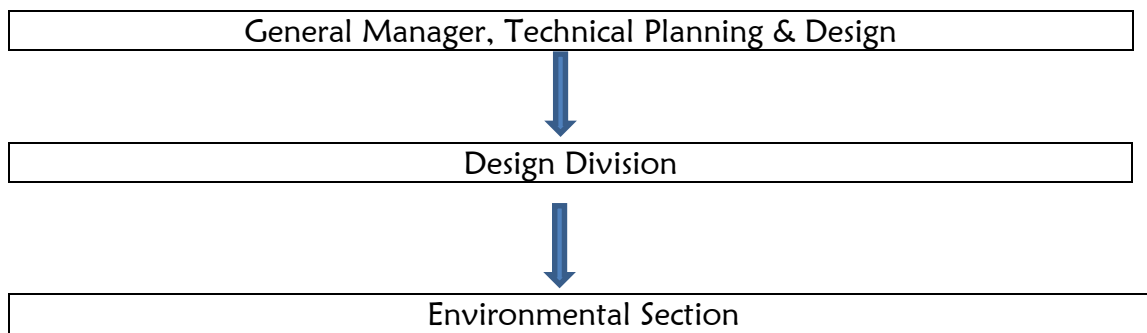
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## 2.3 ENVIRONMENTAL SECTION

### 2.3.1 General

The Environmental section is responsible for integrating environmental concerns to foster sustainable development of projects.

### 2.3.2 Administrative structure



### 2.3.3 Processes in Environmental Section

The core activities of the section include:

- (i) Carrying out Environmental Social Impact Assessment
- (ii) Carrying out Summary project reports

### 2.3.4 Purpose


The purpose of this procedure is to ensure effective undertaking of Environmental and Social Impact Assessment in accordance with the National Water Harvesting and Storage Authority and the government's statutory policies, procedures and regulations.

### 2.3.5 Scope

This SOP applies to the ESIA for large dam, small dam, water pans, Boreholes and flood control structures and works carried out by NWHSA projects.

### 2.3.6 References

- Kenya Constitution 2010
- Environmental Management and Co-Ordination Act (1999)
- Design reports
- NEMA environmental impact and audit guidelines
- Kenya Gazette (legal notice no. 31)

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### 2.3.7 List of abbreviations


- CEO:** Chief Executive Officer
- GM-TP&D:** General Manager Technical Planning and Design
- GM-FCP:** General Manager Finance, Corporate and Planning
- CPO:** Chief Procurement Officer
- ESIA:** Environmental and Social Impact Assessment
- TOR:** Terms of Reference
- EIAS:** Environmental impact assessment statement
- EMP:** Environmental Management Plan
- EIASR:** Environmental Impact Assessment Statement Report
- NEMA:** National Environment Management Authority
- RAP:** Resettlement Action Plan

### 2.3.8 Definition of Terms

- Screening:** This is the process of deciding on whether an ESIA is required
- Scoping:** This is the process of identifying the key environmental issues

### 2.3.9 Responsibility

The Chief Chemist, (Lead Environmental Expert) shall be responsible for the implementation and effective supervision of these procedures.

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## **2.3.10 Standard operating procedure for carrying out Environmental Social Impact assessment for large dams -NWHSA/TPD/SOP/01/ENV**

### **2.3.10.1 Source**

Design division, Business development unit

### **2.3.10.2 Required inputs/Resources**


- Memos
- Resource persons (Experts)
- Camera, Laptop, Stationeries
- Conducive working environment
- Budgetary Allocations
- Environmental management and coordination act (no 8 of 1999)
- Questionnaires

### **2.3.10.3 Expected outputs**

- 2.3.10.1 Minutes
- 2.3.10.2 Filled questionnaires
- 2.3.10.3 Public participation register
- 2.3.10.4 Scoping report (TOR)
- 2.3.10.5 ESIA report
- 2.3.10.6 Gazette notice
- 2.3.10.7 Public comments
- 2.3.10.8 NEMA licence


### **2.3.10.4 Customers**

- Nema, Public, NWHSA Construction & electromechanical department and Procurement

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### 2.3.10.5 Procedure details for carrying out ESIA Study for Large Dams

No.	Process Details/Description	Resources	Responsibility	Timeline	Output	Measure of Success (KPI)
1	The Environmental section receives request from design section to conduct ESIA study	Personnel	GMTPD	As and when they come	Projects to be to be subjected to ESIA	List of projects
1.	The GMTPD in consultation with the Chief Chemist forms a project environmental team.	Staff	GMTPD, Chief Chemist	1 day	Team	Team formed
2.	The Team leader of project environmental team request for facilitation to conduct the ESIA study	Staff, Memo for facilitation	CEO, GM-TP&D, Chief Chemist, Team Leader	5 days	Approved memo	Facilitation approved
3.	The team conducts desktop studies	Design reports, state of Environment reports, laptop, stationaries	ESIA project team	7days	ESIA desktop report	Completed ESIA Desktop Report
4.	Scoping process is conducted to come up with the terms of reference for the study and submitted to NEMA	Community and relevant stakeholders, Budget, questi	ESIA project team, CEO, NEMA	1 Month	Scoping report, Terms of reference,f	Approved TOR


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No.	Process Details/Description	Resources	Responsibility	Timeline	Output	Measure of Success (KPI)
		onnaire			illed questionnaires	
5.	<p>Once the TOR are approved, the team will:</p> <ul style="list-style-type: none"> <li>Examining the TORs for each expert and</li> <li>assigning responsibilities to each member of the team</li> <li>develop a budget and request for facilitation</li> </ul>	Budget, Personnel Laptop. approved ToR	Team Leader	1 week	Work Schedule, Approved facilitation	Work schedule, Facilitation provided
6.	<p>Carrying out ESIA Field work may include:</p> <ul style="list-style-type: none"> <li>Collection of baseline information</li> <li>Water sampling for quality analysis</li> <li>Conducting workshops/seminar;</li> <li>Holding community meetings and public hearings</li> <li>public consultation at the project area;</li> </ul>	Stationary, approved TOR, Camera, Sampling bottle, community RAP, Questionnaire  , Invitation letter and Notice for meetings	GM-FCP GM-TP&D, CPO ESIA project team, Kenya Administratio n	21 days	EMP plan, Minutes, Certificate of water quality, ESIA field data	Certificate of water quality analysis, ESIA field data

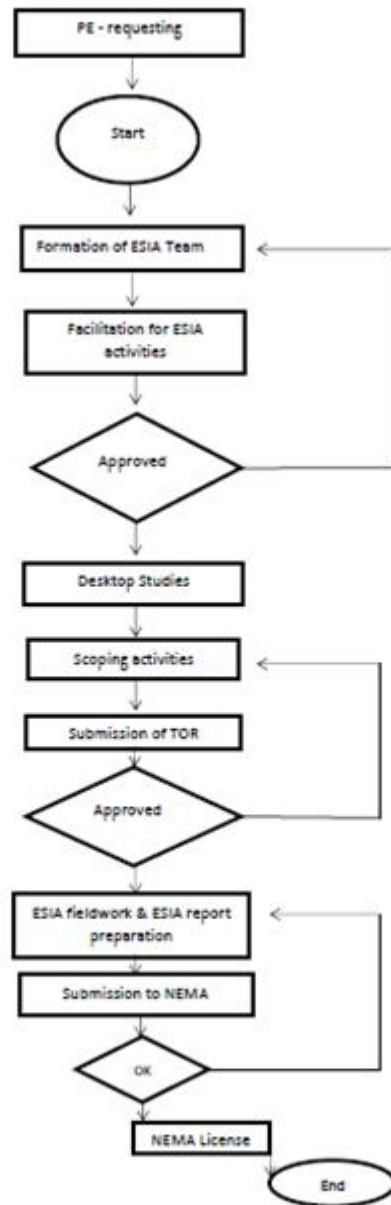



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No.	Process Details/Description	Resources	Responsibility	Timeline	Output	Measure of Success (KPI)
7	Report writing	ESIA field data	ESIA project team	15 days	ESIA report	ESIA report
8.	<ul style="list-style-type: none"> <li>• Submission of the ESIA report to NEMA</li> <li>• Public consultation process via the media</li> <li>• Publication in the media of a summary of the impacts and mitigation measures for the project</li> <li>• Collection of public comments by NEMA</li> <li>• Notice of improvement by NEMA for the study, if needed</li> <li>• Award of NEMA License</li> </ul>	Budget, ESIA report, Forwarding letter to NEMA, Personnel	CEO GM-FCP, Chief Chemist, GM-TP&D, Chief Communication Officer, Government printers	9 Weeks (roughly)	NEMA license, Gazette notice, Advert in the local dailies, public comments	Forwarding letter, Delivery note/book Nema License awarded, Nema correspondence

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### 2.3.10.6 Process flow for carrying out ESIA Study for Large Dams



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### **2.3.11 Standard Operating Procedure of Carrying out summary project report (SPR) for Boreholes, water pan and small dams Source- NWHSA/TPD/SOP/01/SPR**

#### **2.3.11.1 Source**

Design division, Business development unit

#### **2.3.11.2 Required inputs/Resources**


- Approved imprest Memo
- Resource persons (Experts)
- Camera, Laptop, Stationeries
- Conducive working environment
- Budgetary Allocations
- Environmental management and coordination act (no 8 of 1999)
- Questionnaires

#### **2.3.11.3 Expected outputs**

- Minutes
- Filled questionnaires
- Public participation register
- Summary project report
- NEMA licence


#### **2.3.11.4 Customers**

- Nema, Public, NWHSA Construction & electromechanical department and Procurement


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### 2.3.11.5 Procedure Detail of carrying out summary project report (SPR) for Boreholes, water pan and small dams

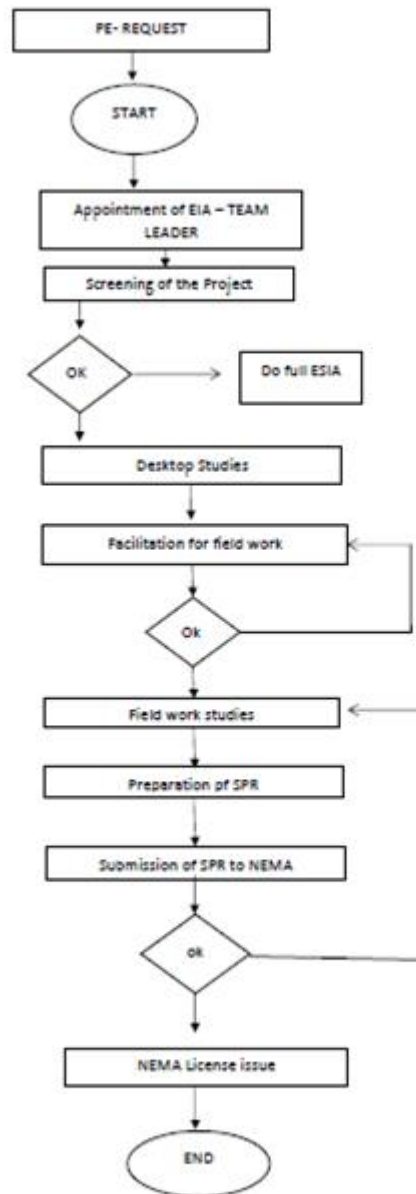
No.	Process Details/Description	Resources	Responsibility	Timeline	Output	Measure of Success (KPI)
1	Appointment of team by GMTTPD in consultation with the Chief Chemist	Stationary, Laptop	Chief Chemist	1 day	Memo	Memo
2.	<p>Screening exercise:  Screening is carried out to categorize the project and from this a decision is made on whether or not a full EIA is to be carried out. Screening criteria categories include:</p> <p>(i) Characteristics of the Proposed Development,  (ii) Location of the Proposed Development and,  (iii) Characteristics of Potential Impacts</p>	NEMA SPR guidelines Personnel, Design report	EIA Expert	1day	Screening report	Project categorized
3.	Carrying out Desktop studies	Design report, Stationary, Laptop, State of environment reports, County Integrated Development Plan (CIDP), EMCA guidelines	EIA Expert	3 days	Baseline report, Questionnaire	Baseline report Questionnaire developed
4.	Request for facilitation to carry out Field work studies	Budget, Request Memo	EIA Expert	3 days	Approved Facilitation Memo	Approved facilitation Memo


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5.	Carrying out field work studies	Notice for public participation, Invitation letter for stakeholders, Questionnaire, Camera. GPS, WRA permits Hydrogeological report, Landownership document	EIA Expert	5 days	Field data, Filled questionnaires	Field data, Filled questionnaires
6.	SPR Preparation	Field data, Laptop, Stationary	EIA Expert	3 Days	SPR	SPR
7.	Submission and approval of SPR	SPR	CEO EIA Expert	7 Days	Nema License	Nema License

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**2.3.11.6 Process flow of carrying out summary project report (SPR) for Boreholes, water pan and small dams**




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### 2.3.12 Records/Retained Documented Information

- Work plans
- Environmental Socio impact assessment reports
- Summary project reports
- Approved Memos
- Nema License

### 2.3.13 Risks and Mitigation Measures

Risk	Mitigation measures
Community rejection	Community consultation and engagement
Delay in facilitation for EIA exercise	Adherence to approved work plans

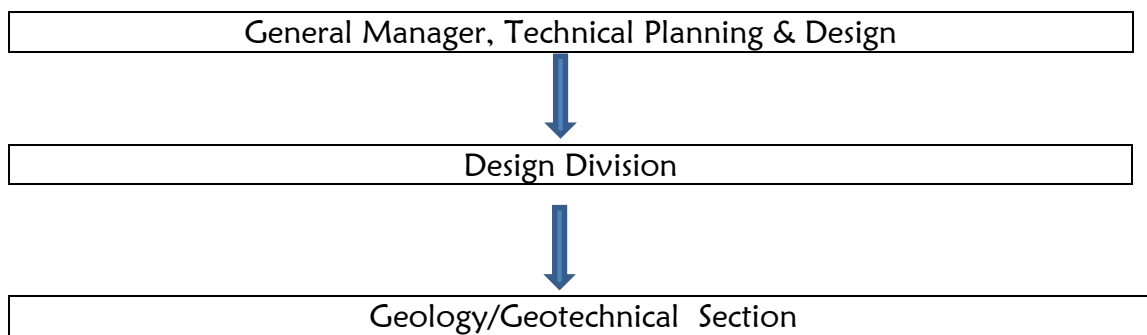
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## 2.4 GEOLOGY/GEOTECHNICAL SECTION

### 2.4.1 General Overview

The section activities involve hydro- geotechnical survey for boreholes and geophysical studies for dams

### 2.4.2 Administrative structure



### 2.4.3 Process for hydrogeological survey

#### 2.4.4 Purpose

The purpose of this procedure is to ensure effective undertaking of Hydro-geophysical survey in accordance with the National Water Harvesting and Storage Authority and the government's statutory policies, procedures and regulations.

#### 2.4.5 Scope

This SOP applies to the hydro-geological survey for large dam and Boreholes carried out by NWHSA projects.

#### 2.4.6 References

- Kenya Constitution 2010
- Design reports

#### 2.4.7 List of abbreviations

**CEO:** Chief Executive Officer

**GM-TP&D:** General Manager Technical Planning and Design


**GM-FCP:** General Manager Finance, Corporate and Planning

**CPO:** Chief Procurement Officer

**WRA:** Water Resources Authority


**NEMA:** National Environment Management Authority



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### **2.4.8 Responsibility**

The Senior Geologist shall be responsible for the implementation and effective supervision of these procedures.

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## 2.4.9 Standard Operating Procedure for carrying out hydrogeological survey- NWHSA/TPD/SOP/01/HGEO

### 2.4.9.1 Source

Design division, Business development unit

### 2.4.9.2 Required inputs/Resources


- Approved imprest Memo
- Resource persons (Experts)
- Furniture and Equipment, Stationeries
- Conducive working environment
- Budgetary Allocations

### 2.4.9.3 Expected outputs

- WRA permit
- Hydrogeological report


### 2.4.9.4 Customers

- WRA, Public, NWHSA Construction & electromechanical department and Procurement


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#### 2.4.9.5 Procedure detail for hydro-geological survey


No.	Process Details/Description	Resources	Responsibility	Timeline	Output	Measure of Success (KPI)
1	NWWSA may receive Requests from the Counties, other Government institutions, Individuals, private firms or NWWSA may also come up with other projects selected from the National Water Master Plan in line with the Vision 2030 and the Sustainable Development Goals.	Personnel	GMTPD, CEO	As and when they come	Projects to be designed	List of projects
2	The GMTPD shall appoint a team to carry out a Hydro-geophysical survey	Laptops, Stationary Personnel	GMTPD	2 days	Hydro-geophysical survey Team	Letter of appointment
3	The Team leader of Hydro-geophysical team requests for facilitation to conduct the study	Staff, Memo for facilitation	CEO, GMTPD, Team Leader	5 days	Approved memo	Approved Facilitation
4	The team conducts desk studies to review existing data and information on the geology and hydrogeology of the locations, interpretation of remote sensing data collated from aerial photographs, satellite imagery, topographical and geological maps.	Personnel Laptops, Aerial Photographs, Satellite image Topographical and geological maps	Team	7 days	Desk study report	Desk study report

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5	The team shall undertake a site visit to the project area and take the necessary information regarding the project site for preparation of the Hydrogeological survey	Personnel Finances Equipment Desk study report, Hydro-Geophysical surveying equipment,	Team leader/Team	6 Days	Data for Geophysical field work	Fieldwork report
6	Analysis and documentation of field work report	Personnel Laptop	Chief HRA Chief PO	10 days	Hydro-geophysical survey Report	Hydro-geophysical survey Report
7	Submission of Hydro-geophysical survey report	Hydrogeological survey report, Finances, Forwarding letter	CEO, GM-FCP, Geologist	1 months	Submitted Hydro-geophysical survey report	WRA permit

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**2.4.9.6 Process flow mapping for Hydrogeological survey**


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### 2.4.10 Records/Retained Documented Information

- Work plans
- Hydro-geophysical survey report
- Approved Memos
- WRA permit
- Approved Budget

### 2.4.11 Risks and Mitigation Measures

Risk	Mitigation measures
Delays in processing of WRA permits	Follow ups with WRA
Inadequacy of technical staff	Recruit technical staff Outsource technical staff

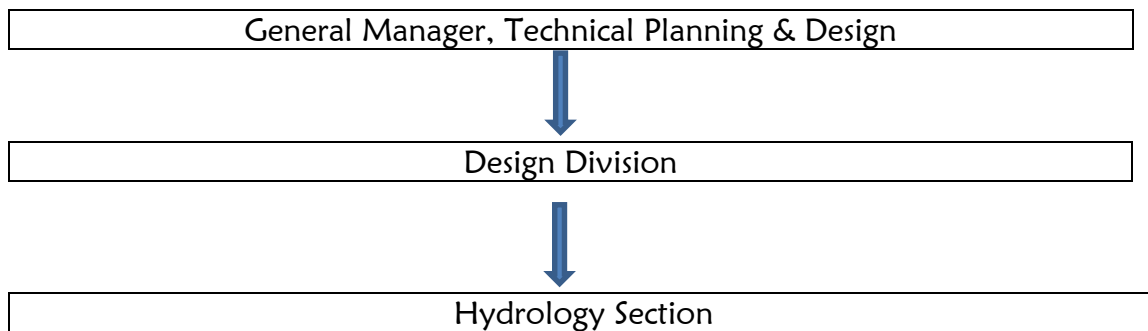
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## 2.5 HYDROLOGY SECTION

### 2.5.1 General Overview

This section's core mandate is carrying out hydrological studies and ensuring acquisition of WRA permits for NWHSA projects

### 2.5.2 Administrative structure



### 2.5.3 Processes in Hydrology section

#### 2.5.4 Purpose

The purpose of this procedure is to ensure effective undertaking of hydrological studies in accordance with the National Water Harvesting and Storage Authority and the government's statutory policies, procedures and regulations.

#### 2.5.5 Scope

This SOP applies to the hydrological studies for large dam, small dam, water pans, and flood control structures and works carried out by NWHSA projects.

#### 2.5.6 References

- Kenya Constitution 2010
- 

#### 2.5.7 List of abbreviations

**CEO:** Chief Executive Officer

**GM-TP&D:** General Manager Technical Planning and Design


**GM-FCP:** General Manager Finance, Corporate and Planning

**CPO:** Chief Procurement Officer

**KMD:** Kenya Metrological Department

**WRA:** Water Resources Authority

**ESIA:** Environmental Social impact assessment

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## 2.5.8 Responsibility

The Senior Hydrologist shall be responsible for the implementation and effective supervision of these procedures

## 2.5.9 Standard Operating Procedure for Carrying Out Hydrological Study

### 2.5.9.1 Source

Design division, Business development unit

### 2.5.8.2 Required inputs/Resources

- Memo
- Resource persons (Experts)
- Furniture and Equipment, Stationeries
- Conducive working environment
- Budgetary Allocations


### 2.5.9.3 Expected outputs

- WRA permit
- Hydrological report

### 2.5.9.4 Customers


- WRA, Public, NWWSA Construction & electromechanical department




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### 2.5.9.5 Detailed procedure for hydrological study

No.	Process Details/Description	Resources	Responsibility	Timeline	Output	Measure of Success (KPI)
1	The GMTPD shall appoint a team to carry out a Hydrological survey	Laptops, Stationary Personnel	GMTPD	2 days	Hydro-geophysical survey Team	Letter of appointment
2	The Team leader of Hydrological team requests for facilitation to conduct the study	Staff, Memo for facilitation	CEO, GM-TP&D, Hydrologist	5 days	Approved memo	Approved Facilitation
3	Desktop to get baseline information/data about the catchment area. Existing catchment management plans	Hydrological and meteorological data,	Hydrologist	7 days	Baseline report	Baseline report
4	Field Work: During the site visit, the team gathers baseline information about the catchment including but not limited to: <ul style="list-style-type: none"> <li>• Land-cover/vegetation</li> <li>• Soil characteristics</li> <li>• Drainage characteristics</li> </ul>	WRUA, WRA, KMD, Community, Design report, County Integrated Development Plan (CIDP), State of	Team leader/Team	6 Days	Runoff data, Meteorological data	Fieldwork report


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	<ul style="list-style-type: none"> <li>• General slope of the catchment area</li> <li>• Water resources including: rivers, dams, wetlands, boreholes etc.</li> <li>• Water resources usage</li> <li>• In-situ runoff estimation</li> <li>• Consultation with the local community to gather any other relevant information</li> </ul>	Environment reports				
5	Analysis and documentation of field work report	Personnel Laptop	Chief HRA Chief PO	6 days	Hydro-geophysical survey Report	Hydro-geophysical survey Report
6	Submission of Hydrological report	Hydrological report, Finances, Forwarding letter	CEO, GM-FCP, Hydrologist	1 months	Hydrological report	WRA permits, Hydrological report

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### 2.5.9.6 Process flow of Hydrological studies



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### 2.5.10 Records/Retained Documented Information

- Work plans
- Approved Memos
- Hydrological reports
- WRA permits

### 2.5.11 Risks and Mitigation measures

Risk	Mitigation measures
Delays in processing of WRA permits	Follow ups with WRA
Inadequacy of technical staff	Recruit technical staff Outsource technical staff