



ENVIRONMENTAL PROCEDURES MANUAL

Community Relations and Environment
Environmental Procedures, Processes, and Approach

VISION

Achieve the highest standards for responsible and sustainable development of our country's natural resources.

MISSION STATEMENT

We exist to responsibly and sustainably develop our country's natural resources to meet society's needs, contributing to a brighter future for our people, our communities, and our other stakeholders, always conscious of being stewards of the environment where we operate.

CORE VALUES

Responsibility
Leadership
Respect
Integrity
Financial Growth
Safety
Teamwork

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This **OPERATIONS MANUAL** of the Environment Unit of the Nickel Asia Corporation (NAC) and its mining companies consists of Environmental procedures for Land Development and Management, Air Quality Monitoring, and Water Quality Monitoring.

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The purpose of this manual is to provide all team members of Mine Environmental Protection and Enhancement Department of the subsidiary companies of Nickel Asia Corporation with a reference book containing environmental procedures, processes, and approach used under operating circumstances within the operating companies. For special situations, it is recommended that the appropriate department/business unit be contacted.

I. OBJECTIVE

To establish and implement an environmental management system standard for all operating companies of Nickel Asia corporation that will support them to accomplish the following goals:

- a. Achieve 100 % rehabilitation of mined-out areas;
- b. Achieve DENR standard for air and water quality monitoring;
- c. Increase carbon sequestration; and
- d. Compliance to all DENR regulations - all OpCos should not receive Notice of Violation

II. SCOPE

Define the action and responsibilities of each member of the section/unit to ensure effectiveness and efficiency during undertaking the following activities:

A. Land Development and Management

1. Land Rehabilitation & Reforestation
2. Solid waste management
3. Hazardous Wastes Management

B. Air Quality Monitoring

1. TSP/PM10 Monitoring
2. GHG Emission monitoring
3. Dust control and road maintenance processes

C. Water Quality Monitoring

1. TSS Monitoring
2. Dredging of silt deposits

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III. DEFINITION OF TERMS

a. Aboveground Biomass	Includes the biomass of tree, understorey and herbaceous vegetation.
b. Acclimatize	Process of conditioning seedlings to the extreme conditions of the planting area before out-planting.
c. Air pollutant	any matter found in the atmosphere other than the oxygen, nitrogen, water vapor, carbon dioxide, and the inert gases in their natural or normal concentrations, that is detrimental to health or the environment, which includes but not limited to smoke, dust, soot, cinders, fly ash, solid particles of any kind, gases, fumes, chemical mists, steam and radio-active substances.
d. Air Pollution	Any alteration of the physical, chemical and biological properties of the atmospheric air, or any discharge thereto of any liquid, gaseous or solid substances that will or is likely to create or to render the air resources of the country harmful, detrimental, or injurious to public health, safety or welfare or which will adversely affect their utilization for domestic, commercial, industrial, agricultural, recreational, or other legitimate purposes.
e. Air sampler	Devices or equipment used to sample a measured amount of air in a specified time to quantitate the particulate or microbiological status of air within a controlled environment.
f. Ambient air quality	General amount of pollution present in a broad area; and refers to the atmosphere's average purity as distinguished from discharge measurements taken at the source of pollution.
g. Ambient Water	Refers to the surface water such as rivers and streams, and marine waters.
h. Biomass	Organic material (above-or below ground, live or dead)
i. Carbon neutral	a state where the net amount of carbon dioxide or other carbon compounds emitted into the atmosphere is reduced to zero through actions undertaken to reduce emissions and/or offset emissions
j. Carbon pool	A reservoir or a system which has the capacity to accumulate or release carbon. Examples are forest biomass, wood products, soils and atmosphere.
k. Carbon sink	Natural features that absorb CO ₂ , such as forest or seas.

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l. Carbon stock	Absolute quantity of carbon held within a pool at specified time; Expressed in tons/ha
m. Carbon Sequestration	Process of removing carbon from the atmosphere
n. Dibble	Pointed hand tool for making holes in the ground for seeds or young plants.
o. Effluent	Discharge from known source, which passes into a body of water or land.
p. Emission	Any air contaminant, pollutant, gas stream or unwanted sound from a known source which is passed into the atmosphere.
q. Emission Factor	A coefficient that relates the activity data to the amount of chemical compound which is the source of later emissions. Emission factors are often based on a sample of measurement data, averaged to develop a representative rate of emission for a given activity level under a given set of operating conditions. (amount of Carbon/unit activity)
r. Fertilization	Application of organic or inorganic formulations for the purpose of enhancing plant growth and development.
s. Fugitive Dust	Refers to very small particles suspended in the air, the source of which is primarily the earth's soil. It does not include particulate matter from other common sources, such as vehicle exhaust or smokestacks.
t. Germplasm	Any part of the plant (e.g. seeds, shoot, root, stem, leaves) that can be source in the production of new plant.
u. Global Warming Potential (GWP)	Measure of how much heat a greenhouse gas traps in the atmosphere up to a specific time horizon, relative to carbon dioxide.
v. Greenhouse gases	Those gases that can potentially or can reasonably be expected to induce global warming, which include carbon dioxide, methane, oxides of nitrogen, chlorofluorocarbons, and the like.
w. Hardening-Off	Process of gradually exposing the seedlings into extreme weather conditions by exposing them to strong sunlight, harf wind and cool temperatures, and reducing the daily watering over a 15-30 days' period.
x. Hazardous substances	Substances which present either: (1) short-acute hazards such as acute toxicity by ingestion, inhalation, or skin absorption, corrosivity or other skin or eye contact hazard or the risk of fire explosion; or (2) long-term toxicity upon repeated exposure, carcinogenicity (which in some cases results in acute exposure but with a long latent period),

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	resistance to detoxification process such as biodegradation, the potential to pollute underground or surface waters.
y. High quality seedlings	Planting material produced with good physical (not lanky, balanced root and shoot ratio; healthy; good root system) and genetic characteristics (germplasm obtained from highly superior mother trees).
z. Infectious wastes	Portion of medical waste that could transmit an infectious disease.
aa. J-rooting	results from the soft tap root getting bent when planted from a common tray into a small propagation tray. When main roots emerge too deep in the media, they can grow up toward the surface
bb. Litter	Comprise of dead plant material that lies on top of the mineral soil
cc. Mobile source	Any vehicle propelled by or through combustion of carbon-based or other fuel, constructed and operated principally for the conveyance of persons or the transportation of property or goods.
dd. Mother trees	Usually largest tree in the forest or in a stand and possess phenotypically superior traits.
ee. Out planting	Actual planting of seedlings or planting stocks in the prepared holes for the purpose.
ff. Orthodox seeds	Seeds that can be stored for a longer period, few months or years.
gg. Ozone Depleting Substances (ODS)	Those substances that significantly deplete or otherwise modify the ozone layer in a manner that is likely to result in adverse effects on human health and the environment such as, but not limited to, chlorofluorocarbons, halons and the like.
hh. Particulate matter 10 (PM10)	Particulate matter with an aerodynamic diameter less than or equal to nominal 10 micrometres.
ii. Pricking	Technique of moving/uprooting of germinated seedlings from germination bed and transplanted to soil potted in polybags.
jj. Persistent Organic Pollutants (POPs)	Organic compounds that persists in the environment bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment. These compounds resist photolytic, chemical and biological degradation, which shall include but not be limited to dioxin, furan, Polychlorinated

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	Biphenyls (PCBs), organochlorine pesticides, such as Aldrin, dieldrin, DDT, hexachlorobenzene, lindane, toxaphere, and chlordane.
kk. Pollution Control Device	Any device or apparatus used to prevent, control or abate the pollution of air caused by emissions from identified pollution sources at levels within the air pollution control standard established by the Department.
ll. Pollution Control Technology	Pollution control devices, production processes, fuel combustion processes or other means that effectively prevent or reduce emissions or effluent.
mm. Pot bed	Area where soil media potted in polybags were arranged/placed.
nn. Potting/ pricking out	Transferring of germinants from seed boxes and seed beds to individual polybags.
oo. Rate of Carbon Sequestration	Expressed in tons/ha/yr
pp. Recalcitrant seeds	Seeds that cannot be stored for a longer period, life span is only few days or weeks.
qq. Soil media	Mixture of soil, compost and sand potted in polybags for the production of native species of seedlings.
rr. Stationary source	Any building or immobile structure, facility or installation which emits or may emit any air pollutant.
ss. Seed viability	Ability of seeds to germinate.
tt. Understorey/Herbaceous	Undergrowth which includes saplings, wildlings and grass
uu. Wildling	refers to the collected native species of seedlings from adjacent undisturbed areas.
vv. Water quality	Condition of water including chemical, physical and biological characteristics with respect to its suitability for a particular purpose.

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IV. ROLES AND RESPONSIBILITIES

Process	Section/Unit	Responsibility
Nursery Operation	LRM/MRRS Company Forester	<ul style="list-style-type: none"> • Ensure availability of labor and materials needed, otherwise, request shall be filed with the concerned Department; • Prepare work plan/program and spearhead its implementation; • Monitor the day-to-day activities; • Conduct documentations of activities undertaken; and • Prepare and submit reports to proper authority/s
	Purchasing Department	<ul style="list-style-type: none"> • Facilitate Purchase of items subject of approved PR.
	Warehouse Section	<ul style="list-style-type: none"> • Facilitate the release of requested materials (as per PR)
	Outsource Services	<ul style="list-style-type: none"> • Provide the required services to MRRS
	RMM	<ul style="list-style-type: none"> • Approve plan, requested labor, and material/supplies.
Rehabilitation	Mine Operation Division Mine Engineering Department	<ul style="list-style-type: none"> • Conduct identification and declaration of mined-out area • Conduct identification of areas subject for Temporary Rehabilitation • Conduct mapping and area computation, in hectares.
	Mine Operation Department LRM Section	<ul style="list-style-type: none"> • Facilitate the Backfilling and Re-shaping works which includes topographic re-contouring, slope stabilization, and top-soil matting
	LRM/MRRS	<ul style="list-style-type: none"> • Shall maintain close coordination with Engineering & mine operation Department relative to the subject area for rehabilitation • Shall conduct joint actual site assessment/inspection with Engineering Department for further assessment of the area. • Shall ensure availability of labor and material needed, otherwise, request shall be filed with the concerned Department • Shall prepare work plan/program and spearhead its implementation. • Shall supervise the day-to-day activities. • Shall conduct documentation of activities undertaken
	Purchasing	<ul style="list-style-type: none"> • Facilitate Purchase of items subject of

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	Section	approved PR
	Warehouse	<ul style="list-style-type: none"> Facilitate the release of requested materials (as per PR)
	Outsource Services	<ul style="list-style-type: none"> Provide the required services to MRRS
	ORMM	<ul style="list-style-type: none"> Approve plan, requested labor, and material/supplies.
Solid waste management	MEPEO	<ul style="list-style-type: none"> Responsible for inspection and clearance of wastes Determine volume of wastes for disposal Facilitate disposal of waste in accordance to EMB Regulations
	Office Utility Personnel	<ul style="list-style-type: none"> Responsible for segregation of wastes.
	Outsource Services	<ul style="list-style-type: none"> Provide the required services to MRRS
Hazardous waste management	Pollution control Officer	<ul style="list-style-type: none"> Responsible for inspection and clearance of wastes Determine volume of wastes for disposal Facilitate disposal of waste in accordance to EMB Regulations
Air Quality Monitoring	Pollution Control Officer	<ul style="list-style-type: none"> Secure Permit to Operate (PTO) for air pollution source and control facilities; facilitate its renewal and payment of appropriate fees; Provides DENR information on air quality of OpCos and its corresponding mitigation activities as part of the Self-Monitoring Report (SMR) submission; Conducts monthly air sampling activity to determine the levels of TSP/PM in the ambient air; Collects and analyses the data collected; and Submit reports to DENR-EMB Regional Office
	Purchasing Section	<ul style="list-style-type: none"> Facilitate Purchase of items subject of approved PR Commission accredited third part service provider
	Third Party Service Provider	<ul style="list-style-type: none"> Calibrate the air checker
Dust Control and Road Maintenance Processes	Mine Engineering	<ul style="list-style-type: none"> Coordinate with MEPED, Mine Operations and Safety to finalize road maintenance assignment for water truck operation Provide official map showing the road

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		maintenance assignment of water trucks
	Mine Operation	<ul style="list-style-type: none"> Identify priority areas for road sprinkling
	Pollution Control Officer	<ul style="list-style-type: none"> Dispatch water truck units
Water Quality Monitoring	Pollution Control Officer	<ul style="list-style-type: none"> Provides DENR of the information on air quality of OpCos and its corresponding mitigation activities as part of the Self-Monitoring Report (SMR) submission; Conducts monthly water sampling activity, collects and analyses data; and Submit reports to DENR-EMB Regional Office
	Purchasing Section	<ul style="list-style-type: none"> Facilitate Purchase of items subject of approved PR Commission accredited third party service provider
	Third Party Service Provider	<ul style="list-style-type: none"> Calibrate the water checker
Dredging of silt ponds	MEPEO	<ul style="list-style-type: none"> Involved in identification of silted areas, formulation of dredging plan, and construction of silt pond in coordination with Mine Engineering Maintenance and monitoring of silt ponds; and Document activities conducted
	Mine Engineering	<ul style="list-style-type: none"> Involved in identification of silted areas and formulation of dredging plan Propose design for repair of existing environmental structures
	Outsource Services	<ul style="list-style-type: none"> Provide the required services to MRRS
Construction of environmental structures	MEPEO	<ul style="list-style-type: none"> Reviews environmental parameters and proposes design for the environmental structure Review and identify all galleys and possible run-off Coordinates with mine engineering Inspects and evaluates the structures; Maintenance and monitoring of structures; and Document activities conducted
	Mine Engineering	<ul style="list-style-type: none"> Formulates design, target area and resources needed Construction of environmental structure; and Assigned for the turn-over of structures

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	Outsource Services	<ul style="list-style-type: none"> • Provide the required services to MRRS
Mangrove plantation	MEPEO	<ul style="list-style-type: none"> • Ensure availability of labor and material needed, otherwise, request shall be filed with the concerned Department; • Assigned in the collection, transport, nursery, and planting of mangrove seeds; and • Document activities conducted
Coral Nursery	MEPEO	<ul style="list-style-type: none"> • Ensure availability of labor and material needed, otherwise, request shall be filed with the concerned Department; • Involved in the whole process of nursery; and • Document activities conducted

LAND DEVELOPMENT AND MANAGEMENT

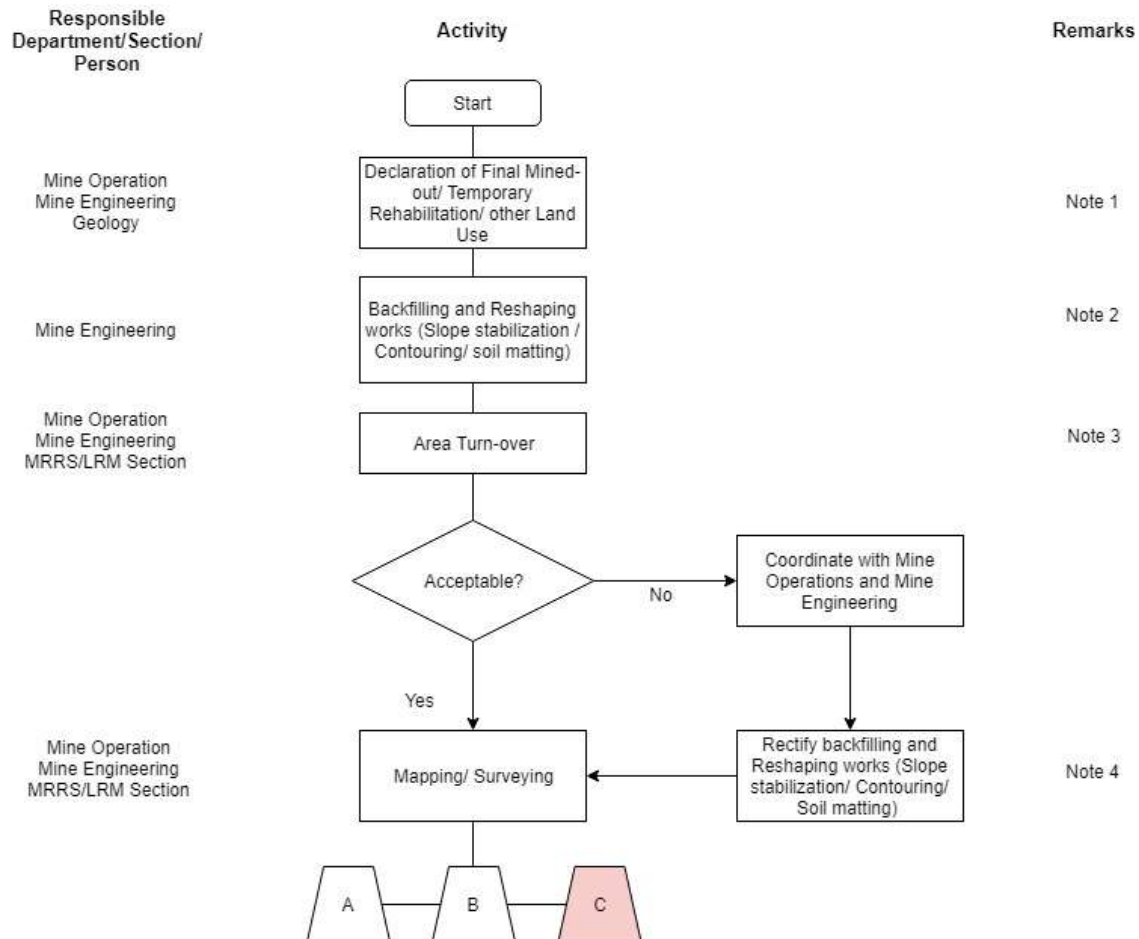


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V. PROCEDURE

A. LAND DEVELOPMENT AND MANAGEMENT

1. Land Rehabilitation and Reforestation



Note 1: Declaration of Final Mined-out/Temporary Rehab and other land-use
 Mine Engineering together with Geology Department declares the area to be mined-out due for final rehabilitation or Temporary Revegetation and/or other land-uses.

Note 2: Backfilling and Reshaping Works
 The area shall be prepared by mine operations such as: topographical slope stabilization, re-contouring and top-soil matting.

Note 3: Area Turn-over
 Prepare Area Turn-over Form and coordinate with Mine Environmental Protection and Enhancement Department for site assessment and evaluation of reshaping works.

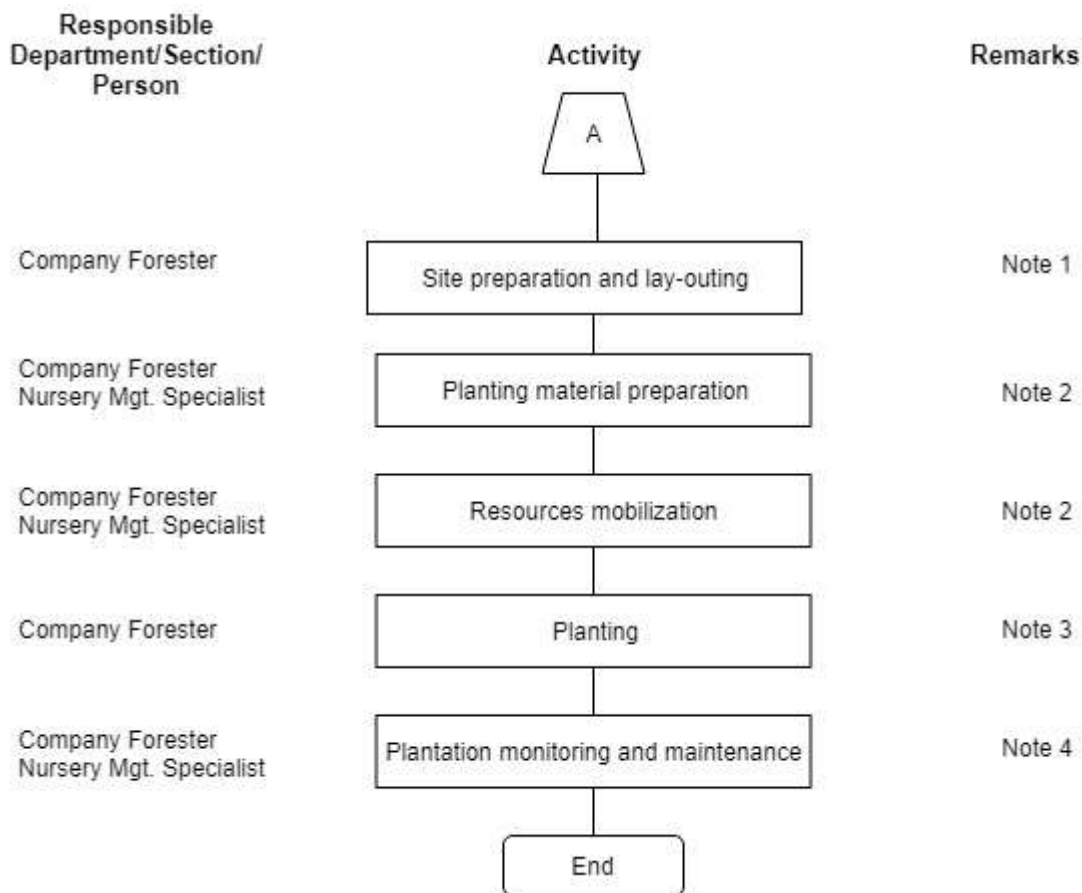
Note 4: Mapping and Surveying
 Survey team to conduct delineation survey of the area to finalize the location of

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boundaries of area/s subject for rehabilitation (Final/Temporary) and/or development.

a. Final Mine Rehabilitation



Note 1: Site Preparation and lay-outing

In planting site preparation, Environmental Aides under the supervision of the Company Forester will conduct the following activities:

- Conduct of lay-outing, and staking activity, spacing and planting density will be dependent on the topography of the area and species to be planted.
- After lay-outing, hole digging using digging bars/hole diggers or small backhoe (for large and very large planting materials) will immediately be carried out.
- Also, basal application of fertilizer to be carried out to ensure that nutrient requirements needed by plants will be available for the planted seedlings for higher survival rate and ensure normal growth rate. Mixture of organic and in-organic type of fertilizer will be use for the purpose.

Note 2: Planting Material Preparation

- Envi-aide for nursery management will carefully select the planting materials readily available for planting.
- Envi-Aide for rehab/refo will facilitate the loading of seedlings from nursery or seedling source to the area. While the Envi aide for reforestation will receive the

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seedlings in the field/area.

Note 3: Planting

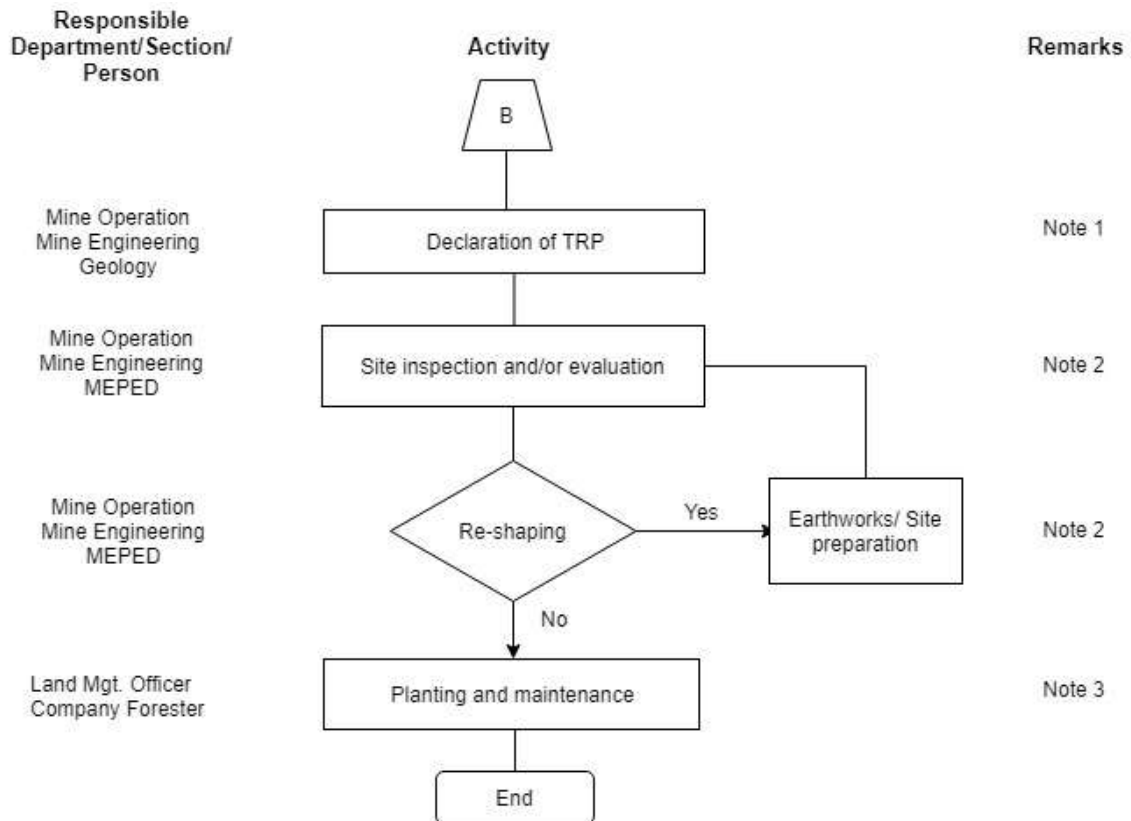
The succeeding steps will be followed in the planting of seedlings. Place the seedlings in the hole horizontally to the ground. Tear the polybags and completely remove it from the seedlings. Place the seedling vertically into the hole, place removed polybags beside the seedling and cover the hole with topsoil. Slightly press/compact the soil around the seedlings using hands or feet to keep it standing straight.

Note 4: Plantation Monitoring and Maintenance

- Company Forester shall conduct regular monitoring of the planted area to assess the growth of the planted trees
- Envi-aide for rehab/refo shall conduct the quarterly field counts to the newly established plantation to determine the survival/mortality rate and the growth performance of planted seedlings/saplings using the field data sheet.
- Company Forester shall monitor/supervise the conduct of plantation maintenance activity such as ring weeding, fertilizer application and replanting or enrichment planting.

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b. Temporary Revegetation



Note 1: Declaration of Temporary Rehab and other land-use

Mine Engineering together with Geology Department declares the area subject for Temporary Revegetation and/or other land-uses.

Note 2: Site inspection and/or evaluation

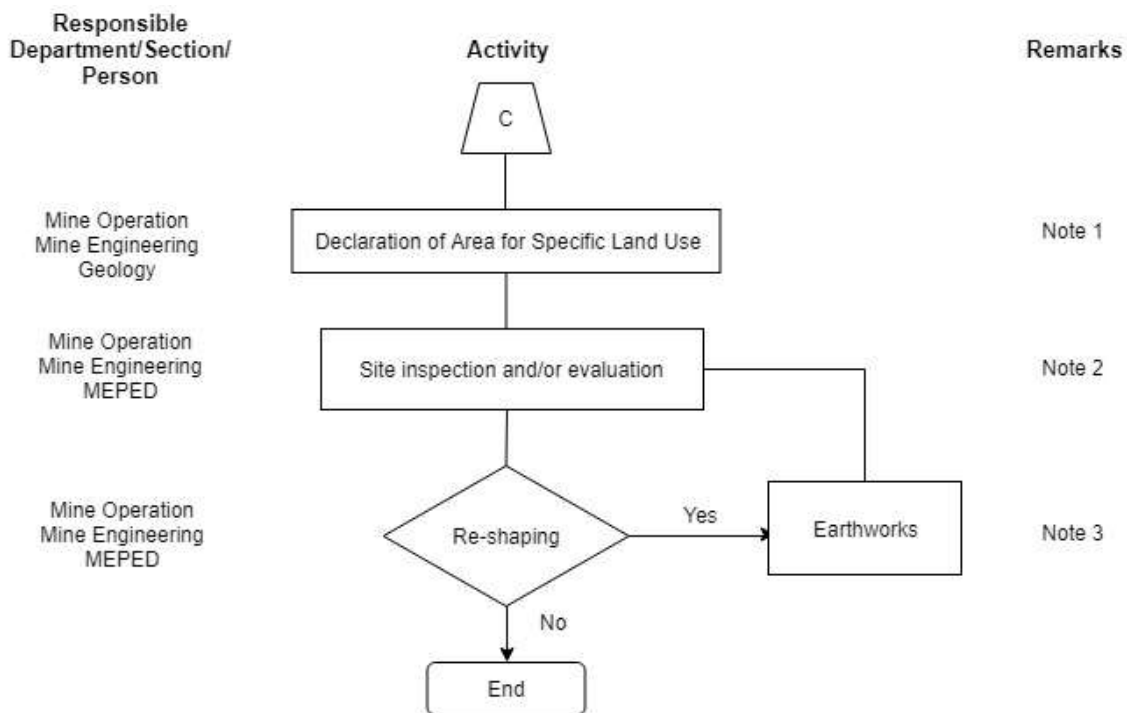
Team composed of Mine Operation, Geology and Mine Environment will conduct site inspection and/or evaluation of the subject area to determine if the area will need reshaping and backfilling works or will immediately proceed on planting activity.

Note 3: Planting & Maintenance

- Company forester will determine the appropriate planting materials for TRP.
- Envi-aide for reforestation will facilitate the collection and/or harvesting of the selected planting materials for the TRP area/s.
- Company Forester shall conduct regular monitoring of the planted area to assess the growth performance of the planted species.

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c. Other Land Use/Settling pond Maintenance



Note 1: Declaration of Area for specific land-use

Mine Engineering together with Geology Department declares the area subject for other land uses i.e. area subject for construction of settling ponds, area subject for landscaping, or view decks or view parks.

Note 2: Site inspection and/or evaluation

Team composed of Mine Operation, Mine Engineering, Geology and Mine Environment will conduct site inspection and/or evaluation of the subject area to determine if the area will need reshaping and backfilling works or will immediately proceed on planting activity.

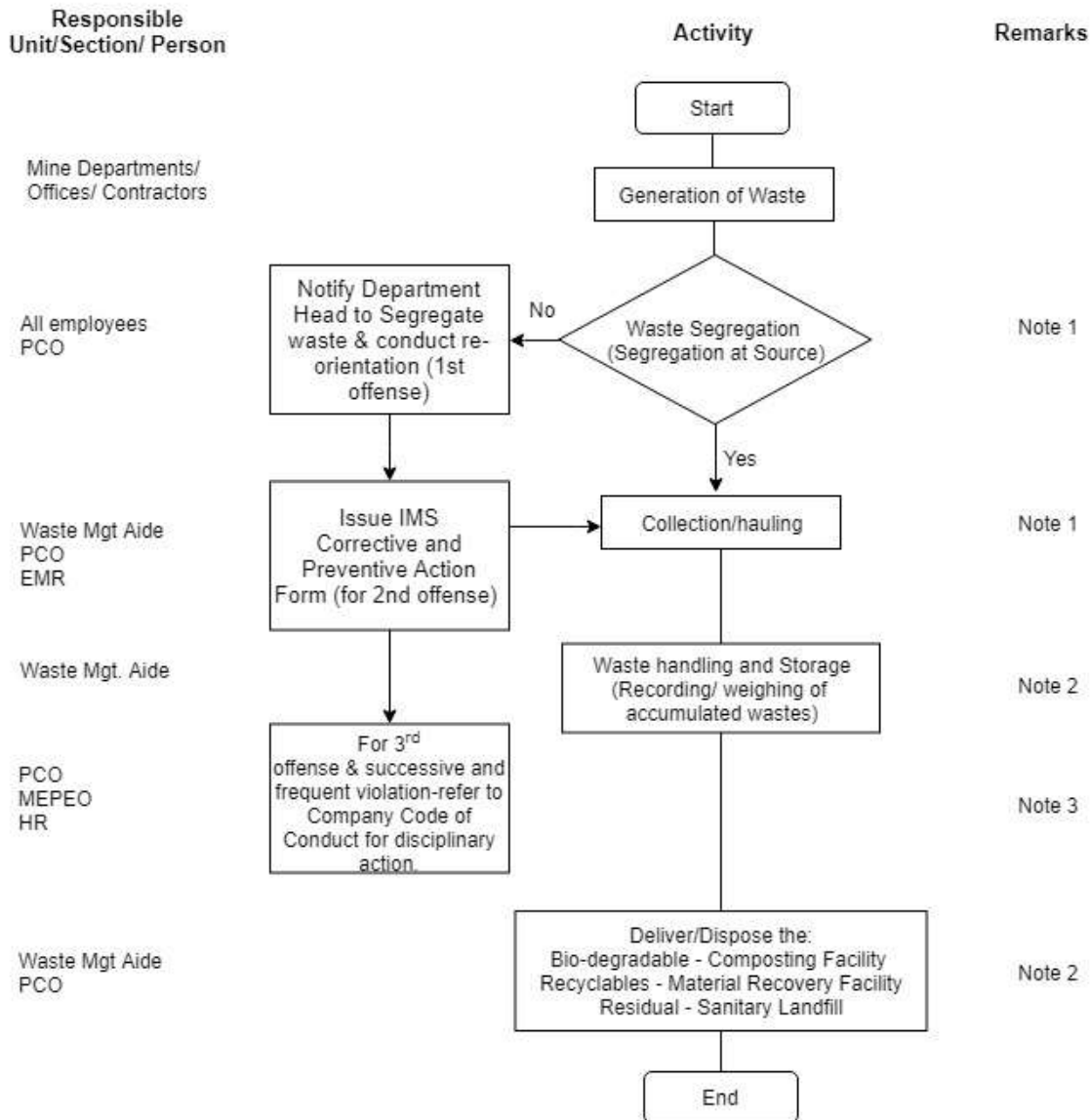
Note 3: Earthworks (Backfilling and/or excavation)

- Mine Operation will facilitate the earthworks activities in close coordination with Mine Engineering and Mine Environment.
- Mine Engineering and Mine Environment will closely monitor the progress of the activity to ensure that the earthworks or execution in the field is in accordance to the approved plan. Any changes on the plan should be coordinated to the concerned group prior the ground execution.

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2. Solid Waste Management

a. For regular wastes (Domestic Wastes/Non-hazardous) from Camps & offices



Note 1: Waste segregation, Collection, Hauling & Disposal

- Primary collection of generated wastes from outside office shall be done by utility workers and will be place at the communal waste bins wherein the Waste Management Team from Mine Environmental Protection and Enhancement Department will collect the generated wastes daily for secondary collection.
- Only segregated wastes shall be collected.
- Segregation of wastes shall be the responsibility of the wastes generator or concerned Department/Section.
- For company contractors, they are required to construct its own MRF, compost pit and Haz- wastes Facility hence only residual waste shall be collected on regular basis base on the collection schedule. Bulky waste such us large cuttings of trees

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or old furniture and other special waste shall be collected upon request to the company appointed Pollution Control Officer.

- Each type of waste shall have separate schedules to avoid mixing of segregated wastes during transport to MRF or the Sanitary Landfill Facility.
- Colour coded waste bins/containers placed in different areas are intended for proper segregation at source where:

Green Colour- wastes bins/container are for generated Biodegradable wastes such as garden wastes, cartons, papers, grass cuttings, leaves, twigs & branches and Kitchen wastes such as food scraps, fish and animal skin and innards, seeds, vegetable and fruit trimmings, coffee grounds, tea bags, used paper napkins, seafood shells, egg shells and dry animal manure.

Blue Colour- wastes bin/container is intended for Non-biodegradable but residual wastes such as jars, broken glasses, plates and windows glass, and tire rims, old furniture's, sanitary napkins, tetra pack, cosmetic bottles and other materials.

Yellow Colour- wastes bin/container is intended for Non-biodegradable but RECYCLABLE WASTES such as Plastic bottles, PET Bottles, ice cream containers, glass bottles, tin cans, old roofing sheets, steel gutters, rods and pipes, pots and pans, drums, brass, copper, and tools, newspaper, ferrous scrap metal, corrugated cardboard, aluminium, office paper, plastics and other recyclable materials.

Red Colour- wastes bin/container is intended for generated SPECIAL/TOXIC WASTES such as paint cans, thinners, lead-acid batteries, spray canisters, previously used as container for chemicals and oil contaminated cloth/rugs and the like.

Red colour waste bins will only present in selected areas especially in Clinic, ASSAY lab, Mechanical, and Construction/Electrical area.

**only green and blue colour wastes bin available for staff houses rooms & offices.*

Note 2. Waste Handling and Storage

- Items classified as waste shall be handled in accordance with this Procedure and Legislative requirements
- All waste shall be stored in a safe and secure manner pending collection by third party contractors for recovery, recycling and/or disposal.
- All Recyclable wastes shall be stored in Material Recovery Facility, generated biodegradable wastes shall be turn-over to composting facility while the residual wastes shall be disposed to company sanitary landfill.
- Wherever possible, access to waste containers will be restricted to the company's designated employees, contractors and contracted waste collection contractors.
- Liquid wastes shall be stored in containers appropriate for the properties of the waste. Such containers will be stored in a suitably bunded area.

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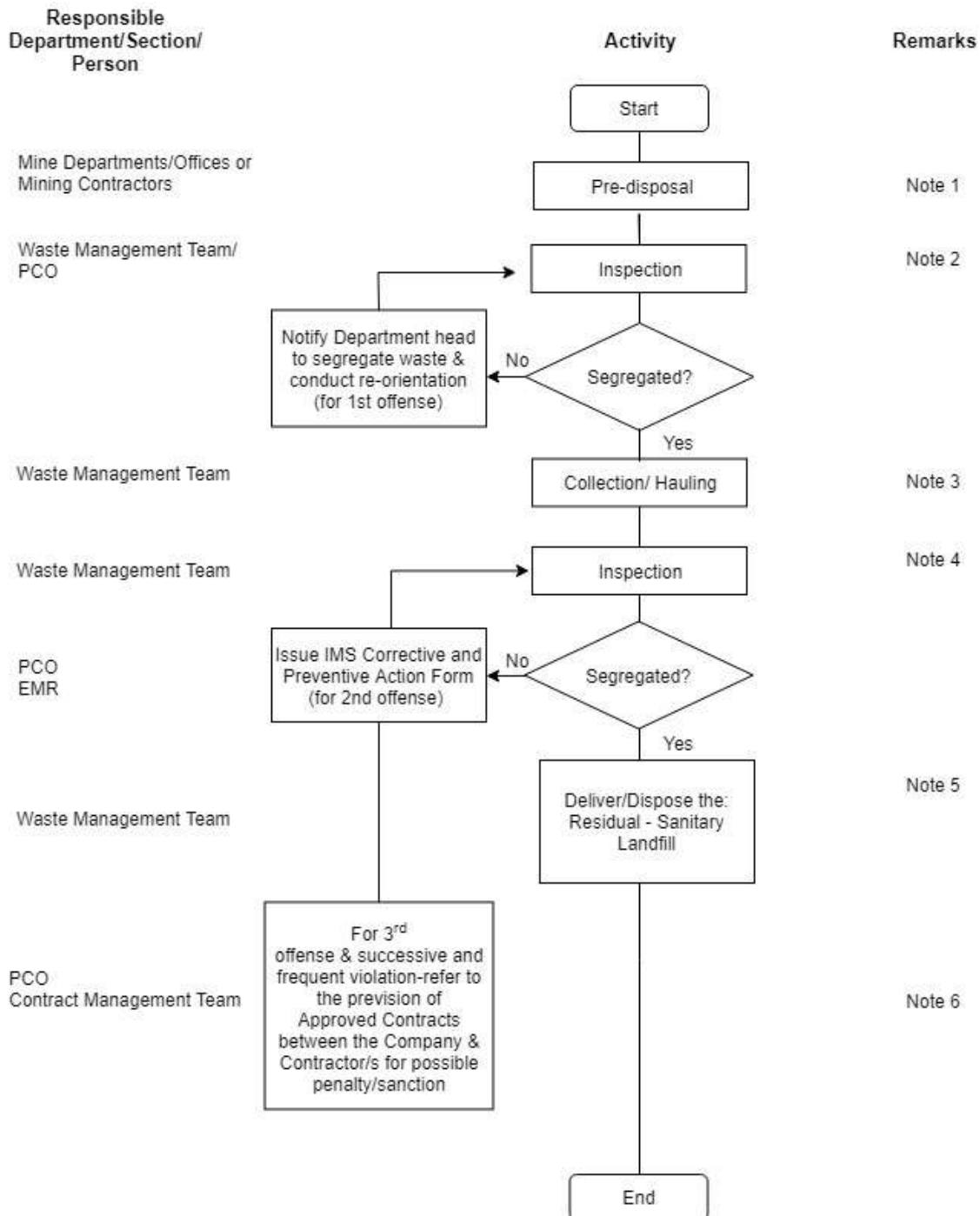
- Waste produced by contractors will be stored in their respective waste facilities. Contractors will demonstrate a duty of care over any waste produced by them on the site.
- Waste generation records shall be submitted to Pollution Control Officer on weekly basis for tracking and monitoring and data interpretation.
- Recyclable/scrap wastes to be disposed to accredited scrap buyer. Disposal to be coordinated with HO Purchasing.

Note 3. Issuance of Corrective Action and/or Disciplinary Action for committed violation

- For first (1st) offense, PCO to notify the department head of concerned group and advise them to segregate their generated wastes.
- PCO to schedule the re-orientation of concerned group to increase the level of awareness on waste management.
- For second (2nd) offense, PCO shall issue IMS Corrective and Preventive Action Form.
- For third (3rd) offense & successive and frequent violation, MEPED to coordinate with HR department for disciplinary action.

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b. For regular wastes (Domestic Wastes/Non-hazardous) from Contractors Camps & offices



Note 1: Pre-disposal

Coordinates with MEPE Department for the transportation and disposal of special wastes. Secures and fills out Waste Collection Form from MEPE Department.

Note 2: Inspection

Issues Waste Collection Form to be filled out by requesting entity. Verifies information

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on the filled-out form. Schedules waste collection. Ensures wastes are properly segregated.

Note 3: Waste collection

Collects and transports waste from point source to SLF. Ensures that WCF is properly and completely filled out prior to transport of wastes.

*Contractors hauls their own wastes using its own vehicles

Note 4: Inspection

Receives and inspects waste in garbage trucks upon arrival; verifies the truck load with the forms and ensure that destination is appropriate for the type of waste being transported. Sanitary Landfill is for residual waste; while MRF is for non-residual waste.

Note 5: Waste dumping and backfilling

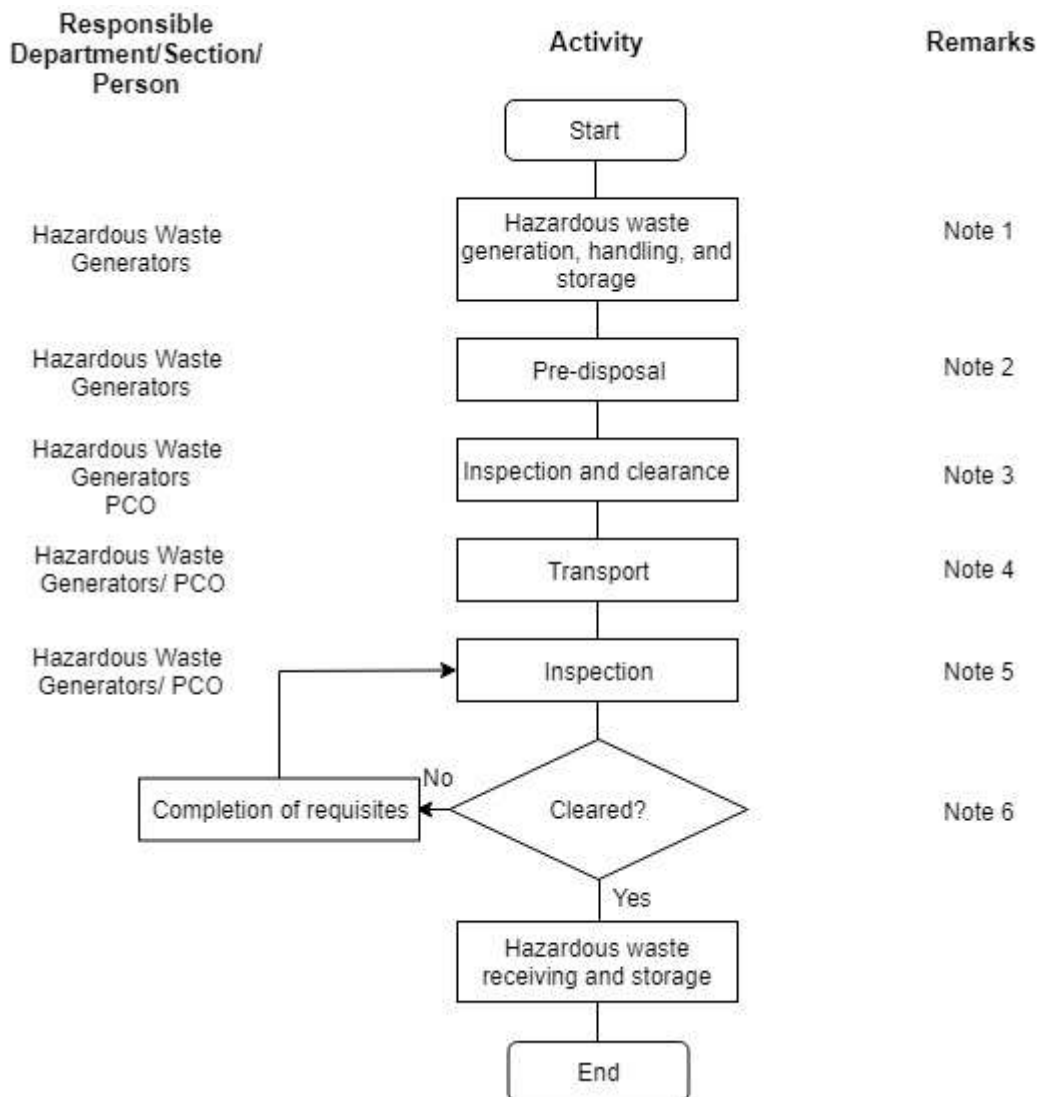
Directs Garbage trucks where to dump their wastes in the SLF or at the Materials Recovery Facility (MRF).

Note 6. Issuance of Corrective Action and/or Disciplinary Action for committed violation

- For first (1st) offense, PCO to notify the department head of concerned contractor/s and advise them to segregate their generated wastes.
- PCO to schedule the re-orientation of concerned group to increase the level of awareness on waste management.
- For second (2nd) offense, PCO shall issue IMS Corrective and Preventive Action Form.
- For third (3rd) offense & successive and frequent violation, MEPED to coordinate with Contract Management for possible penalty/sanction.

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3. Hazardous Waste Management



Note 1: Hazardous waste generation, handling, and storage

- Ensures that hazardous wastes generated are properly handled, segregated, labelled and stored within its respective areas of operation or temporary hazardous wastes areas.

Note 2: Pre-disposal

- Coordinates with the Pollution Control Officer under MEPE Department for the transport and disposal of hazardous wastes. Secures and fills out Hazardous Waste Clearance and Transport Form (Form 1) from MEPE Department prior to haulage to final hazardous waste facilities within the mine site.

Note 3: Inspection and clearance

- Issues Hazardous Waste Clearance and Transport Form to be filled out by requesting entity.
- Inspects hazardous wastes for transport and checks against form requisites and

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program standards.

Note 4: Transport

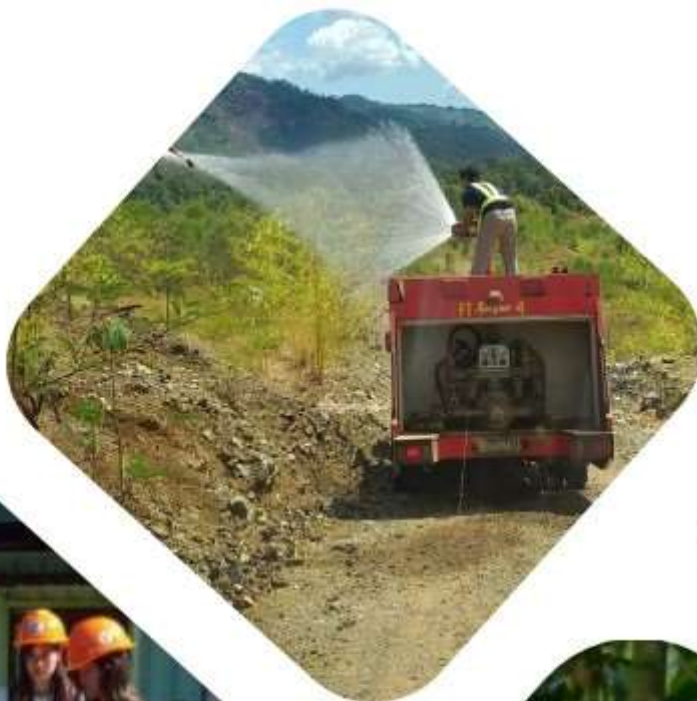
- Ensures the safe transport of hazardous wastes to the designated hazardous wastes storage facilities within the mine. Used Oil Depot/Used oil storage facility:
Used oil
Annex A: Used Batteries, Busted bulbs/fluorescent, paint containers, battery solution and chemical bottles/containers, WEEE
Annex B: Used Oil (drums), kitchen oil, oily water, oil contaminated materials.

Note 5: Inspection

- Inspects and receives hazardous wastes transported by the generators. Directs transport to appropriate facilities.

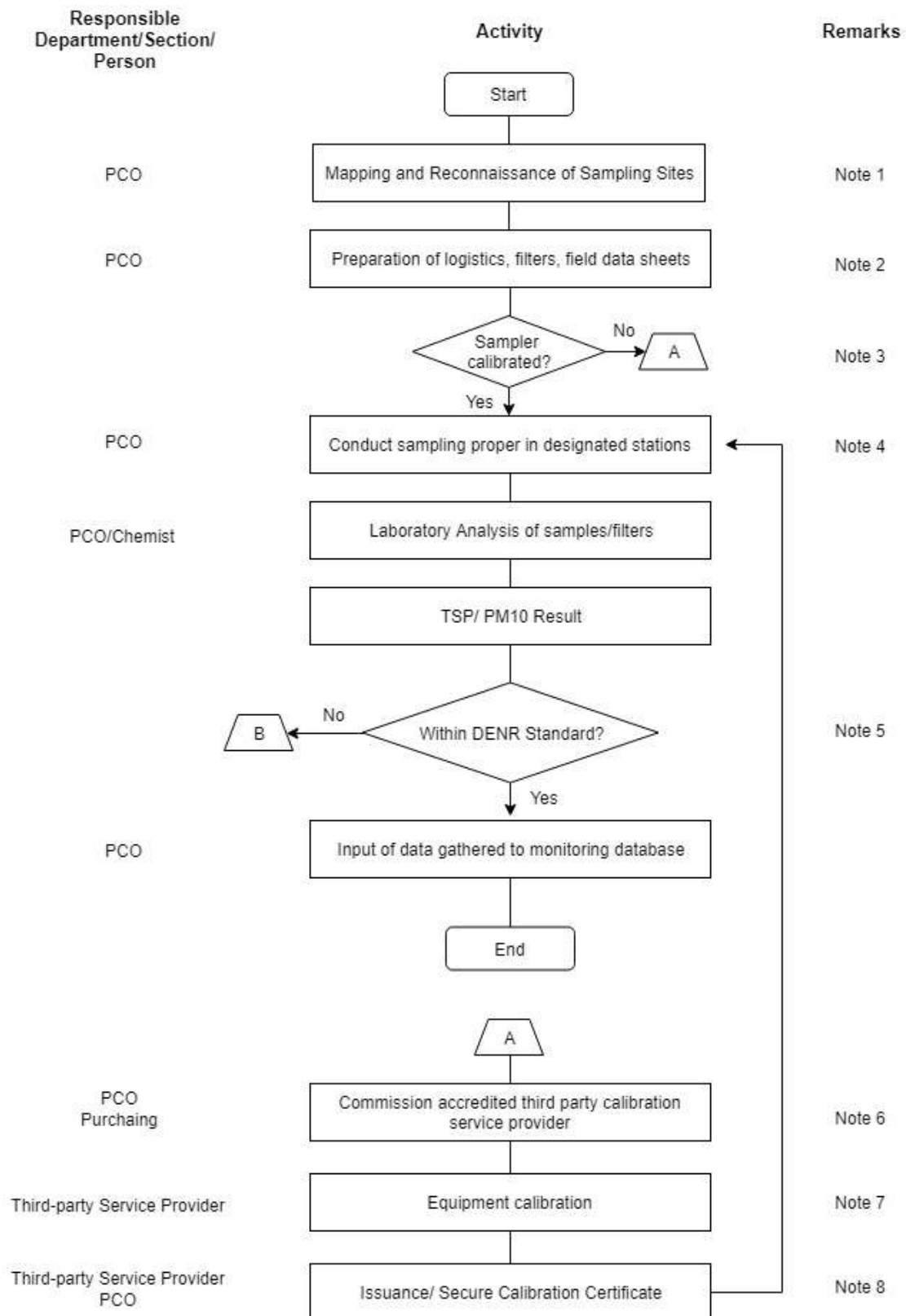
Note 6: If cleared, Directs Garbage trucks where to store their wastes. / Receives and ensure proper storage, labelling and recording of hazardous wastes.

AIR QUALITY MONITORING



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B. AIR QUALITY MONITORING
1. TSP/PM10 Monitoring



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Note 1: Mapping and Reconnaissance of sampling sites

Note 2: Preparation of logistics:

- Prepare necessary equipment and materials such as high-volume air sampler equipment, filters, GPS, Camera and power supply.
- Take the initial weight of the filters with an analytical balance.

Note 3: Conduct calibration as specified in the sampler's instruction manual. If air sampler has been calibrated successfully, proceed to the next process. If not, proceed to process A. Aside from the in-house calibration, it is to be ensured that there is a third-party calibration certificate to certify that annual external calibration was done to the air sampler.

- a. During sampling activities, it is to be ensured that appropriate PPE is worn. Skull guard, safety shoes, reflectorized vest is a must in all stations. Air muffs will be worn when operating gen-set as a power supply.
- b. Conduct air sampling in the designated stations.
- c. Running time of the sampler will be done in the span of 60 minutes (1 hour) in every sampling station. Refer to the instruction manual for its proper operation.

Note 4: Conduct sampling proper in designated stations

- a. Weigh the used filters for its final weight.
- b. Get the net weight of each filter by subtracting the initial weight from the final weight.
- c. Net weight will be then entered in the TSP/PM10 Data Processor to acquire the TSP/PM10 result.

Note 5: Result

The DENR standard for TSP is 230 µg/NCM while PM10 is 150 µg/NCM. If the result exceeds the standard, proceed to the process.

Note 6: Commission accredited third-party calibration service provider

- a. If air sampler cannot be calibrated in-house successfully, seek for a third-party calibrator.
- b. Prepare a request letter/PR and coordinate with Purchasing team to send the equipment to an accredited calibration service-provider or to the equipment supplier.

Note 7: Equipment calibration

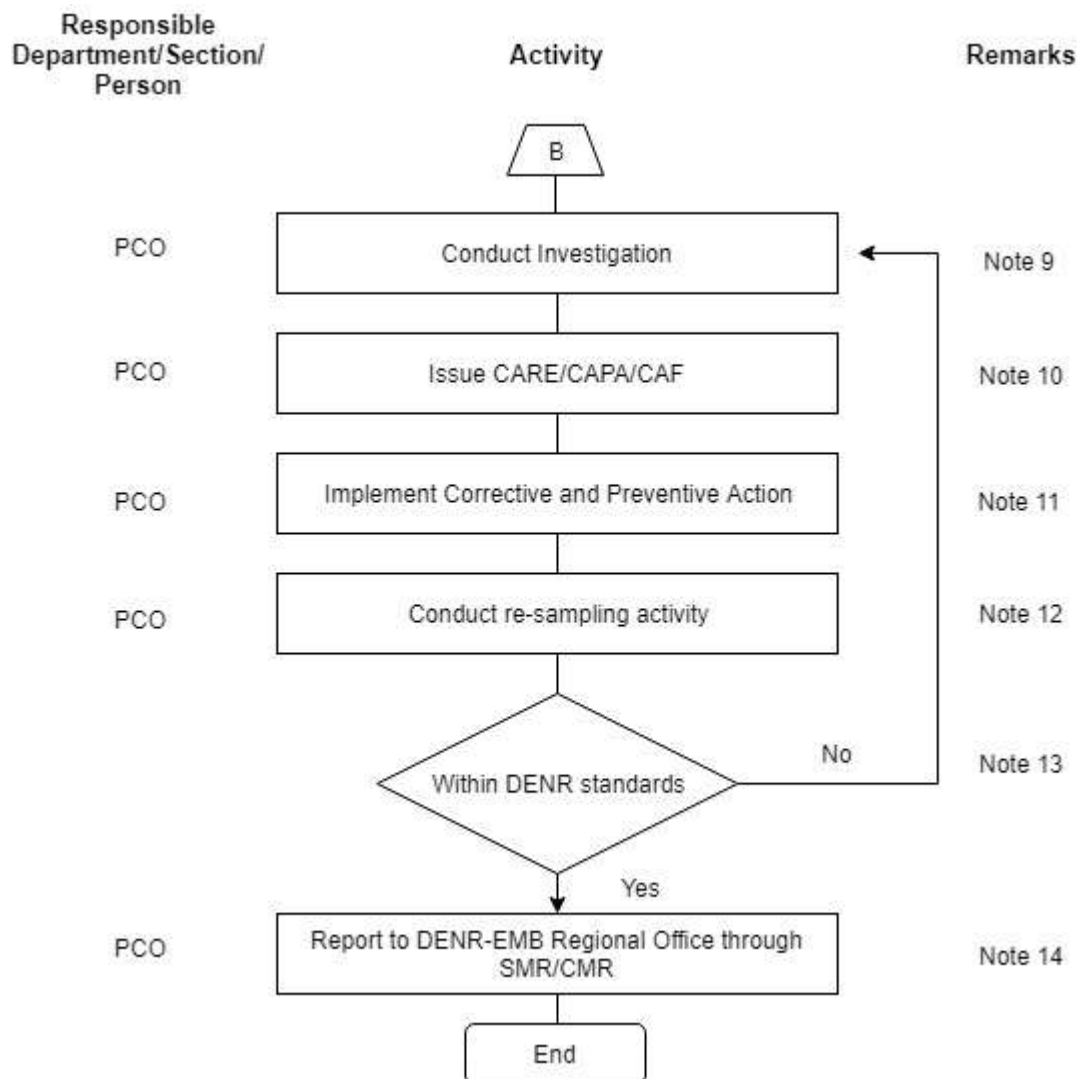
The calibration service provider will conduct the necessary calibration to the air checker.

Note 8: Issuance of calibration certificate

- a. Once successfully calibrated, a calibration certificate will be sent to our end along with the equipment.
- b. PCO to secure Certificate of Calibration of the unit.

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Note 9: Conduct investigation

The PCO will conduct an investigation on the potential source of air pollution.

Note 10: Issue CARE/CAPA/CAF

Once pollution source has been identified, the PCO Staff will issue notice to the concerned/involved Departments/Sections.

Note 11: Intensify mitigation measures

Mitigation measures will be applied and intensified by the concerned Departments/Sections to suppress the source of pollution. PCO will be monitoring the progress and efficacy of the controls/mitigations implemented.

Note 12: Conduct re-sampling activity

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Once controls have been applied, conduct a re-sampling activity to the stations that had exceedance.

Note 13: Results

If result still exceeds the DENR standard, conduct another investigation to inspect areas that might have been overlooked that significantly contributed to the high TSP/PM10 levels.

Note 14: Report to EMB Regional Office

If result is already within the standard, the PCO will be reporting again to the EMB Regional Office to document the mitigation activities applied and to inform them that the emission/exceedance is already controlled and is within the standard.

Sample Collection Procedure

Particulates samples are collected using the high-volume air sampler. Air is drawn through a glass-fiber filter paper and desiccated for twenty-four (24) hours after sampling. The weight of suspended particulates is determined gravimetrically and then divided by the total volume of air sampled corrected to standard conditions. Read the flow-rate indicator and record this reading and the corresponding flow rate as read from the calibration curve. Note also the temperature and barometric pressure. At the end of the sampling period, record all final readings.

Ambient Air Quality Monitoring Calculation

$$V_{mstd} = [V_a(P_a/P_{st})(T_{std}/T_a)^T]$$

where:

P_{st} -standard pressure (inHg) = 29.92

T_{std} -standard temperature (K) = 298.15

T_a -ambient temperature (K)

T -elapsed time (min)

$$TSP = ((W_f - W_i) \times 10^6) / \text{Volume}$$

where:

TSP = mass concentration of total suspended particulate matter, $\mu\text{g}/\text{std m}^3$;

W_i = initial weight of clean filter, g;

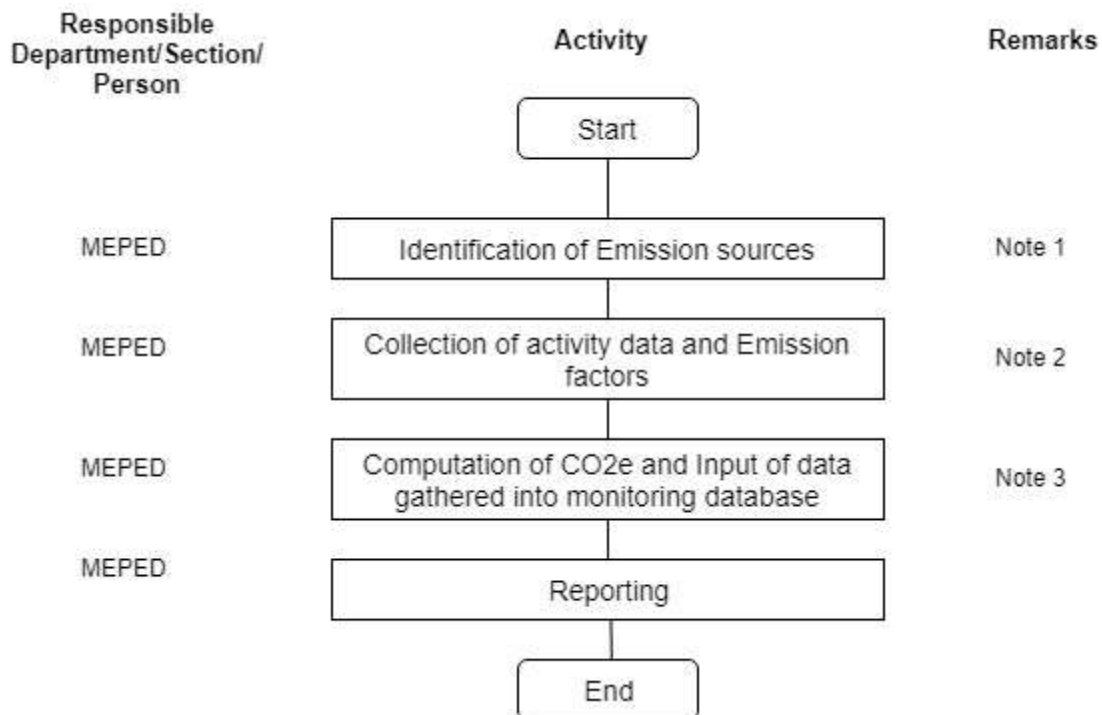
W_f = final weight of exposed filter, g;

V = air volume sampled, converted to standard conditions, std m^3 ,

106 = conversion of g to μg .

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2. Carbon Emission



Note 1: Identification of Emission sources

Scope 1	Fuel (<i>Stationary & Mobile Equipment</i>)
	Fugitive
Scope 2	Power Consumption
Scope 3	LPG
	Air Travel
	Waste Generation (<i>Solid Waste only</i>)
Scope 4	Land Use Change

Note 2: Collection of activity data and identification of Emission Factor

Scope 1.a Fuel

Input data

Fuel Type	Consumption (litres)	% Consumption
Gasoline		
Diesel		
Total		

Identify Emission Factor (EF) and Global Warming Potential (GWP)

Type	Emission Factor		
	kg CO ₂ /L	kg CH ₄ /L	kg N ₂ O/L
Gas	2.300000	0.000331	0.000020
Diesel	2.710000	0.000366	0.000022
Biodiesel	0.000000	0.000382	0.000870

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Ethanol	0.000000	0.000382	0.000870
GWP	1	28	265

Source: GHG Manual- DENR 2011

Scope 1.b Fugitive Emission

Unit	Type of Refrigerants refilled	EF
Refrigerator	R-134 A or HFC-134A	1430
Window Type Aircon	R-22 or HCFC-22	1810
Refrigerator	R-134 A or HFC-134A	1430
Ice Cream Maker	R-22	1810
Car Aircon	R-134 A or HFC-134A	1430
Window Type Aircon	R - 410 A	2088

Scope 3.a LPG

Type	Emission Factor		
	kg CO ₂ /L	kg CH ₄ /L	kg N ₂ O/L
LPG	3.110000	0.000049	0.000005
GWP	1	21	310

Scope 3.b Air Travel

EF	Distance	kg CO ₂ /L	kg CH ₄ /L	kg N ₂ O/L
Long	> 700 miles	0.185000	0.000010	0.000009
Medium	300 - 700 miles	0.229000	0.000010	0.000009
Short	<300 miles	0.277000	0.000010	0.000009
Unknown	unknown	0.271000	0.000010	0.000009
GWP		1	21	310

Note 3: Computation of CO₂e and Input of data gathered into monitoring base

Scope 1.a Fuel

Computation of CO₂ and CO₂ equivalent from Fuel

Emission	Gasoline	Diesel
t CO ₂	$\left(\frac{\text{Gasoline Component} \times \text{EF CO}_2}{1000} \right) \times \text{GWP CO}_2$	$\left(\frac{\text{Diesel Component} \times \text{EF CO}_2}{1000} \right) \times \text{GWP CO}_2$
t CO ₂ e (CH ₄)	$\left(\frac{\text{Gasoline Component} \times \text{EF CH}_4}{1000} \right) \times \text{GWP CH}_4$	$\left(\frac{\text{Diesel Component} \times \text{EF CH}_4}{1000} \right) \times \text{GWP CH}_4$
t CO ₂ e (N ₂ O)	$\left(\frac{\text{Gasoline Component} \times \text{EF N}_2\text{O}}{1000} \right) \times \text{GWP N}_2\text{O}$	$\left(\frac{\text{Diesel Component} \times \text{EF N}_2\text{O}}{1000} \right) \times \text{GWP N}_2\text{O}$

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Scope 1.b Fugitive Emission

$$E = \frac{[(C \times AEF (50\%)) + (C \times ALR (1\% \text{ for window mounted AC})) + DE (0)] \times GWP}{1000}$$

where:

E = emissions from equipment in MgCO₂e

IE = installation emissions

OE = operation emissions

DE = disposal emissions

GWP = 100-year global warming potential of the refrigerant used in the equipment (2007 IPCC 4th report)

$$IE = C \times AEF$$

where:

C = original full refrigerant charge in equipment in kg

AEF = the default installation leakage for new equipment (%). This is omitted if the equipment has been pre-charged by the manufacturer (0.50% for small self-contained air conditioners (window-mounted or through-the-wall))

$$OE = C \times ALR$$

where:

C = original full refrigerant charge in equipment in kg

ALR = the default annual leakage emission factor for equipment (%), (1% for small self-contained air conditioners (window-mounted or through-the-wall))

$$DE = [C \times (1 - (ALR \times S))] \times [(1 - R) - D]$$

where:

C = original full refrigerant charge in equipment in kg

ALR = the default annual leakage emission factor for equipment (%), (1% for small self-contained air conditioners (window-mounted or through-the-wall))

S = time since last recharge of equipment (years)

R = amount of charge recycled from equipment

D = amount of refrigerant destroyed from equipment (kg)

Scope 2. Power

Activity/Operation	EF	tCO ₂ emission (Mg ton ⁻¹)
<i>A Operation</i>	0.815	Total Consumption (MWh) x EF
<i>B Operation</i>		
<i>Other Loads</i>		
Total		

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Scope 3.a LPG

Emission	LPG CO ₂ e
<i>t CO₂</i>	$\left(\frac{\text{Consumption} \times \text{EF CO}_2 \times \text{GWP Co}_2}{1000} \right)$
<i>t CO₂e (CH₄)</i>	$\left(\frac{\text{Consumption} \times \text{EF CH}_4 \times \text{GWP CH}_4}{1000} \right)$
<i>t CO₂e (N₂O)</i>	$\left(\frac{\text{Consumption} \times \text{EF N}_2\text{O} \times \text{GWP N}_2\text{O}}{1000} \right)$

Scope 3.b Air Travel

Emission	Air Travel CO ₂ e
<i>t CO₂</i>	$\left(\frac{\text{No. of passengers} \times \text{Distance} \times \text{EF CO}_2 \times \text{GWP Co}_2}{1000} \right)$
<i>t CO₂e (CH₄)</i>	$\left(\frac{\text{No. of passengers} \times \text{Distance} \times \text{EF CH}_4 \times \text{GWP CH}_4}{1000} \right)$
<i>t CO₂e (N₂O)</i>	$\left(\frac{\text{No. of passengers} \times \text{Distance} \times \text{EF N}_2\text{O} \times \text{GWP N}_2\text{O}}{1000} \right)$

Scope 3.c Waste Generation

Type of Landfill	Waste Composition		Degradable organic carbon (DOC)		DOCf generated (t C)	CH ₄ generated (t CH ₄)	CH ₄ emitted (t CH ₄)	tCO ₂ e
	%	Tons Waste	%	Tons Waste				
Managed					tDOC x % DOCf x Impact of waste	DOCf generated x CF x % DOCf CH ₄	CH ₄ generated x (1 - OX)	GWP x CH ₄ emitted
Unmanaged								

% DOC that degrades (DOCf) – default	60%
Impact of waste site - % DOCf formation default value	40%
% DOCf that is methane – default	50%
C to CH ₄ conversion factor	1.33
Oxidation rate (OX) – default	10%
Global Warming Potential (GWP)	21

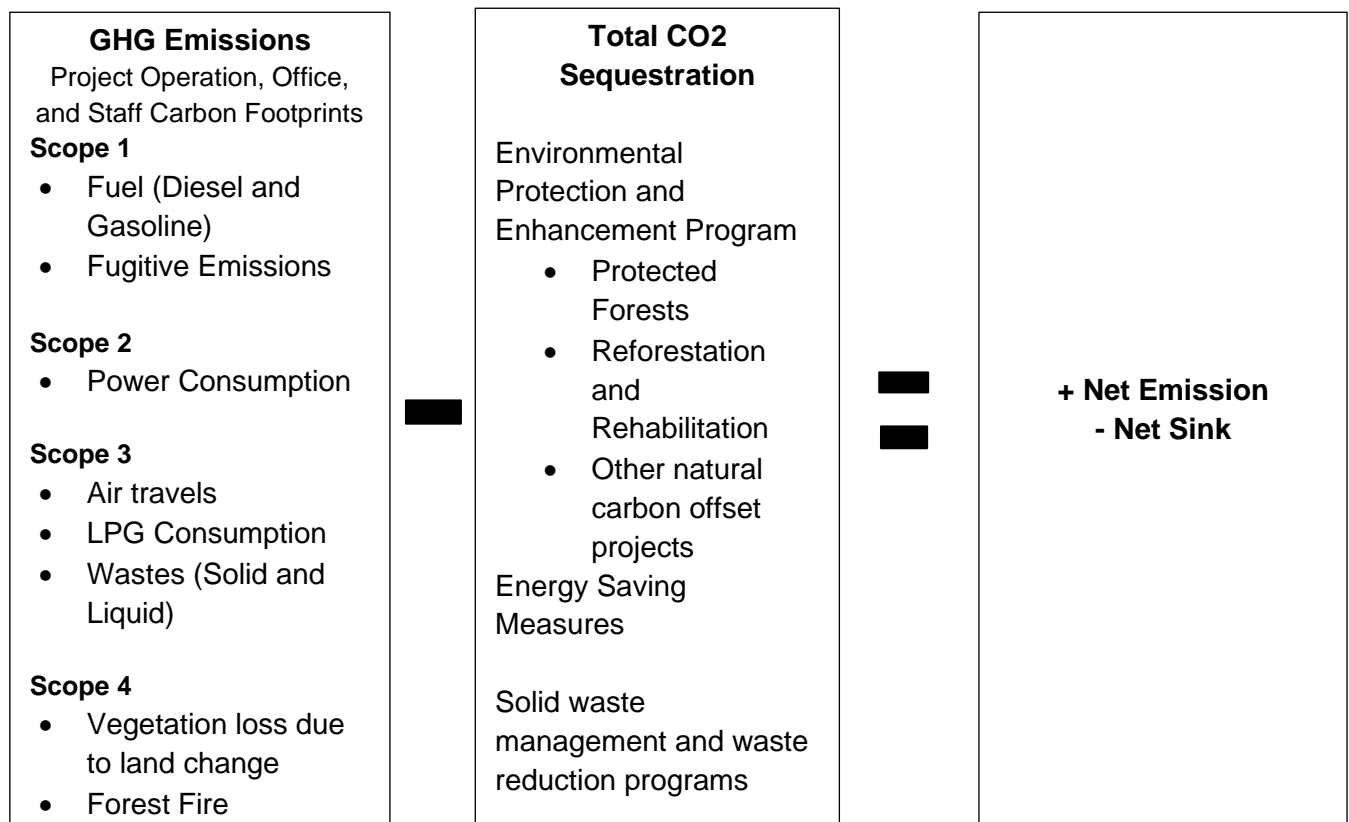
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Scope 4. Land Use Change

Land use	Area		Changes				
	Base Year	Current Year	<i>Change in Area</i>	<i>Change in Biomass</i>	<i>Change in Carbon</i>	<i>Change in CO2 stock</i>	<i>Change in CO2 stock per annum</i>
				Change in area x total above ground biomass	Change in biomass x C content	Change in carbon x 44/12	Change in Co2 / (Year interval)

Land Use	C content in biomass
Old growth forest	0.447
Second growth forest	0.4345
Second growth forest	0.44
Brushland	0.453
Grassland	0.445
Cropland (agrosilvicultural)	0.47
Other Land Uses	0

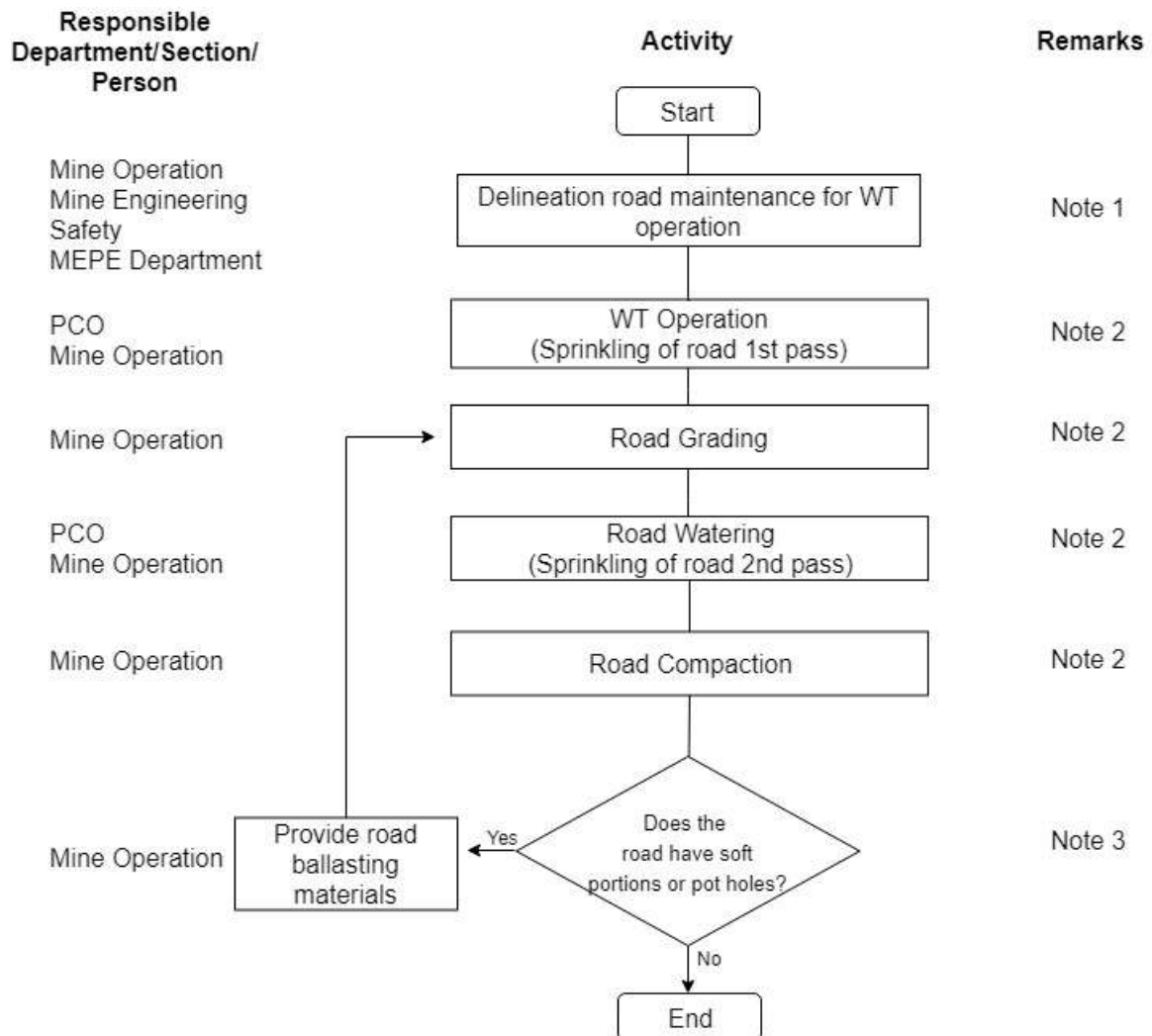
Net CO₂ Emission or Sequestration Potential



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3. Dust Control and Road Maintenance Processes

a. For Operations



Note 1: Delineation of Road Maintenance Assignment for Water Truck Operation.

- Mine Engineering Department in coordination with Mine Operations group, Safety and MEPE Department shall finalize the road maintenance assignment for water truck operation.
- Mine Engineering Department shall provide official map showing the road maintenance assignment of Water trucks (in-house & mining contractors).

Note 2: Water Truck Operation

- Mine operation Supervisor/s to contact the PCO for the priority areas for road sprinkling.
- PCO to dispatch the water truck units as requested by the Mine Operation Supervisor/s.

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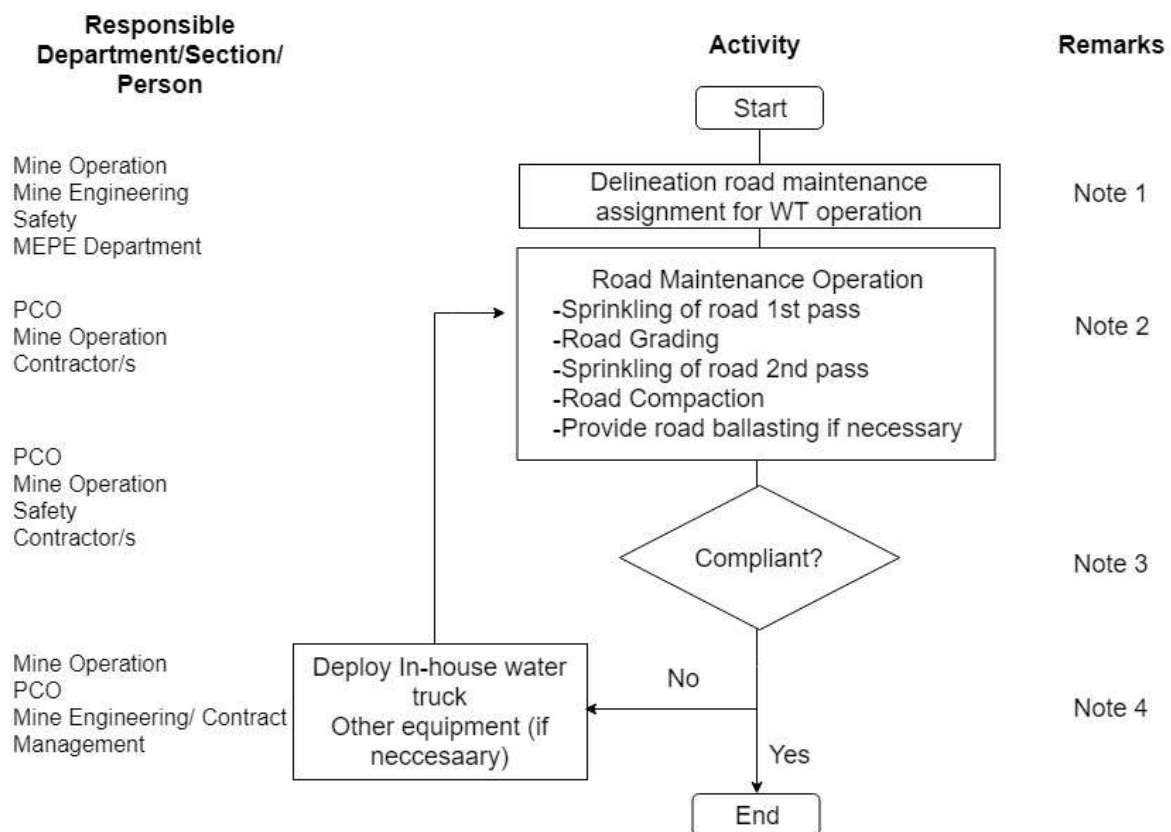
Environmental Procedures, Processes, and Approach

- Right after the water truck operation (1st pass of road sprinkling) the mine operation supervisor/s will immediately deploy the road grader to scrape the accumulated dust.
- After the scraping of accumulated dust, deployment of WT unit for 2nd pass will immediately carried-out for road sprinkling.
- After the 2nd pass of Water truck unit, deployment of road compactor will be carried-out.

Note 3: Road Ballasting

- Delivery for additional ballasting materials for the improvement on the road condition of certain area shall be determined by mine operation supervisor/s.
- If possible, crushed bedrock materials should be delivered to the area since crushed bedrock material has high binding capacity.

b. For Mining Contractors



Note 1: Delineation of Road Maintenance Assignment for Water Truck Operation.

- Mine Engineering Department in coordination with Mine Operations group, Safety and MEPE Department shall finalize the road maintenance assignment for water truck operation.
- Mine Engineering Department shall provide official map showing the road maintenance assignment of Water trucks (in-house & mining contractors).

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Note 2: Water Truck Operation

- Mine operation Supervisor/s and/or PCO to contact the mining contractors for the priority areas for road sprinkling.
- Mining Contractor/s to dispatch the water truck unit/s as requested by the Mine Operation Supervisor/s, PCO, and/or Safety man.
- Right after the water truck operation (1st pass of road sprinkling) immediate deployment of road grader for scraping the accumulated dust will follow.
- After the scraping of accumulated dust, deployment of WT unit for 2nd pass will immediately carried-out together with the road compactor for road compaction.
- Delivery of additional ballasting materials for the improvement on the road condition of certain area shall be determined by mine operation supervisor/s.

Note 3: Evaluation of compliance

- Daily monitoring/evaluation on the level of compliance or performance of contractors shall be done by Mine Operation, Mine Engineering, Pollution Control Officer and/or Safety.

Note 4: Deployment of In-house equipment

- Immediate deployment of In-house water truck to the road assignment of underperforming or non-compliant mining contractor/s shall be done in close coordination with the above-mentioned groups/teams. If the mining contractor fails or refuses to perform such obligation, the Company may perform or cause the performance thereof at the cost of the mining contractor.
- Rental fee of equipment to be immediately deducted to the monthly billing of concerned contractor/s through Contract Management Section under Mine Engineering Department.

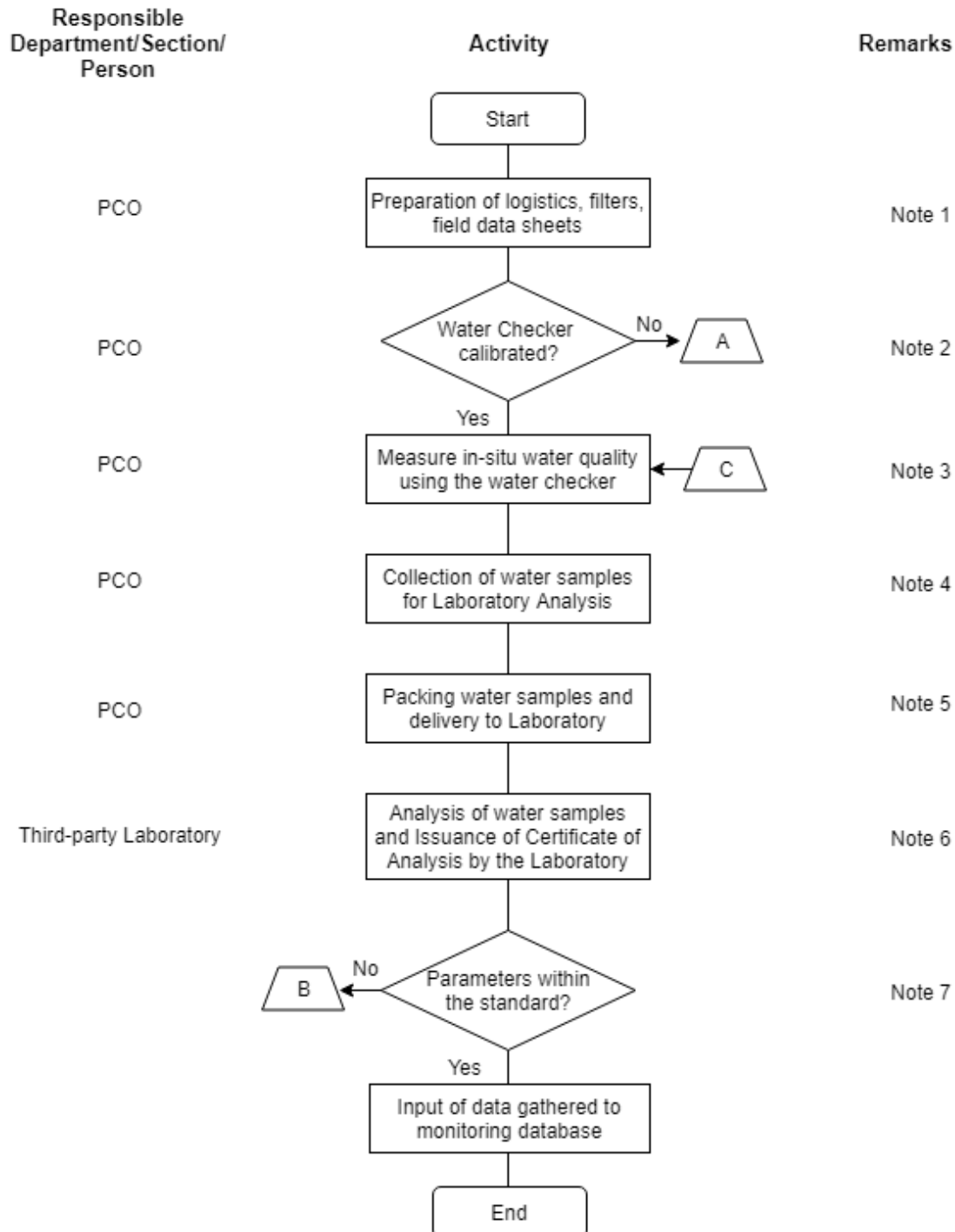
WATER QUALITY MONITORING



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C. WATER QUALITY MONITORING

1. TSS Monitoring



Note 1: Preparation of logistics, filters, field data sheets

- a. Preparation of request letter for the transportation of water samples and the transmittal letter to arrange the pick-up from hangar and delivery of water samples to Laboratory.

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- b. Ensure that transmittal is officially communicated to Liaison Office and OPCOS Head Office.
- c. Also prepare necessary materials for the conduct of water sampling activity such as the water quality checker, sampling bottles, ice, styro-box, scooping Stick, pipet, nitric acid for preservation, label and field data sheets.

Note 2: Water checker calibrated?

- a. Conduct in-house calibration prior to every sampling activity. If water checker has been calibrated successfully, proceed to the next step. If not, proceed to process A.
- b. Aside from the in-house calibration, it is to be ensured that there is a third-party calibration certificate to certify that annual external calibration was done to the water-checker.

Note 3: Measure in-situ water quality

- a. Proceed to the water sampling proper. It is to be ensured that appropriate PPE is worn while performing the following activities. Skull guard, safety shoes or safety boots, reflectorized vest is a must in all stations. Designated PCS Staffs must also wear life vest when in boat.
- b. Obtain in-situ water quality using the water checker. Operate the water checker as specified in the instruction manual.

Note 4: Collection of samples

- a. Collect water samples by grab sampling - collection of a single water sample collected at one time from a single point. Collected samples will be used for the Laboratory analysis.
- b. The necessary parameters set forth in the appropriate DENR Department Administrative Order for nickel operations and limestone quarry operations shall be covered by the appropriate PSIC classifications are ph, total suspended solids (TSS), cadmium, nickel, lead, arsenic and manganese. For Limestone quarry operation under PSIC No. 08102, parameters are pH and TSS. Other parameters such as color, BOD, oil and grease, iron and hexavalent chromium are included for internal monitoring.

Note 5: Packing water samples and delivery to laboratory

- a. Pack the water samples appropriately to prevent contamination and breakage of sample containers during transport. Refer to the Water Quality Monitoring Manual Vol. I and II for the proper preservation, storage and transport of water samples to be brought to the Laboratory for analysis.
- b. Turn-over the water samples to the Transport Personnel/Liaison.
- c. Liaisons/Transport Personnel are to be contacted accordingly to ensure that water samples will be delivered to the Laboratory within 24 hours from the sampling activity.

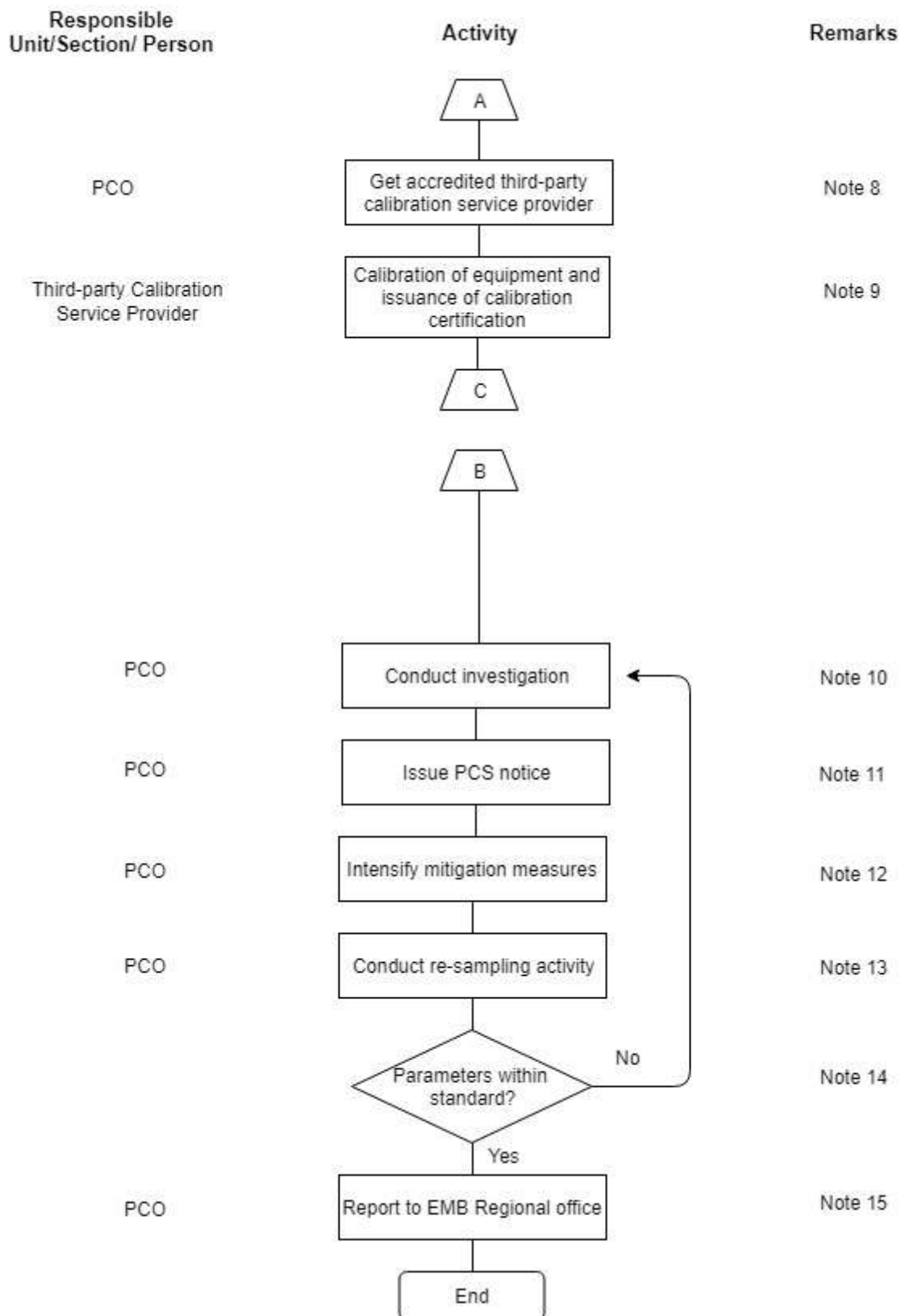
Note 6: Analysis of samples and issuance of certificate

Laboratory will then perform the necessary analysis on the water samples. 2. After the analysis, the Laboratory will release a Certificate of Analysis to our end.

Note 7: Results

- a. Results will be checked if it's within or it has exceeded the DENR standards for water quality.
- b. If results showed that it exceeded/below the standard, proceed to Process B for appropriate actions.

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Note 8: Get accredited third-party calibration service provider

- a. If water-checker cannot be calibrated in-house successfully, engage a third-party calibrator.
- b. Prepare a request letter to send the equipment to an accredited calibration service-provider or to the equipment supplier.
- c. Once approved, facilitate the sending of the equipment.

Note 9: Calibration of equipment and issuance of calibration certification

- a. The calibration service provider will conduct the necessary calibration to the water checker.
- b. Once successfully calibrated, a calibration certificate will be sent to our end along with the equipment.
- c. Proceed to Process C.

Note 10: The PCO will conduct an investigation on the potential source of exceedance.

Note 12: Once pollution source has been identified, the PCO will issue CAPA/CARE to the concerned/involved Departments/Sections.

Note 13: Intensify mitigation measures

Mitigation measures will be applied and intensified by the concerned Departments/Sections to suppress / control the source of pollution. PCO will be monitoring the progress of controls / mitigations implemented.

Note 14: Conduct re-sampling activity

Once controls have been applied, conduct a re-sampling activity to the stations that had exceedance.

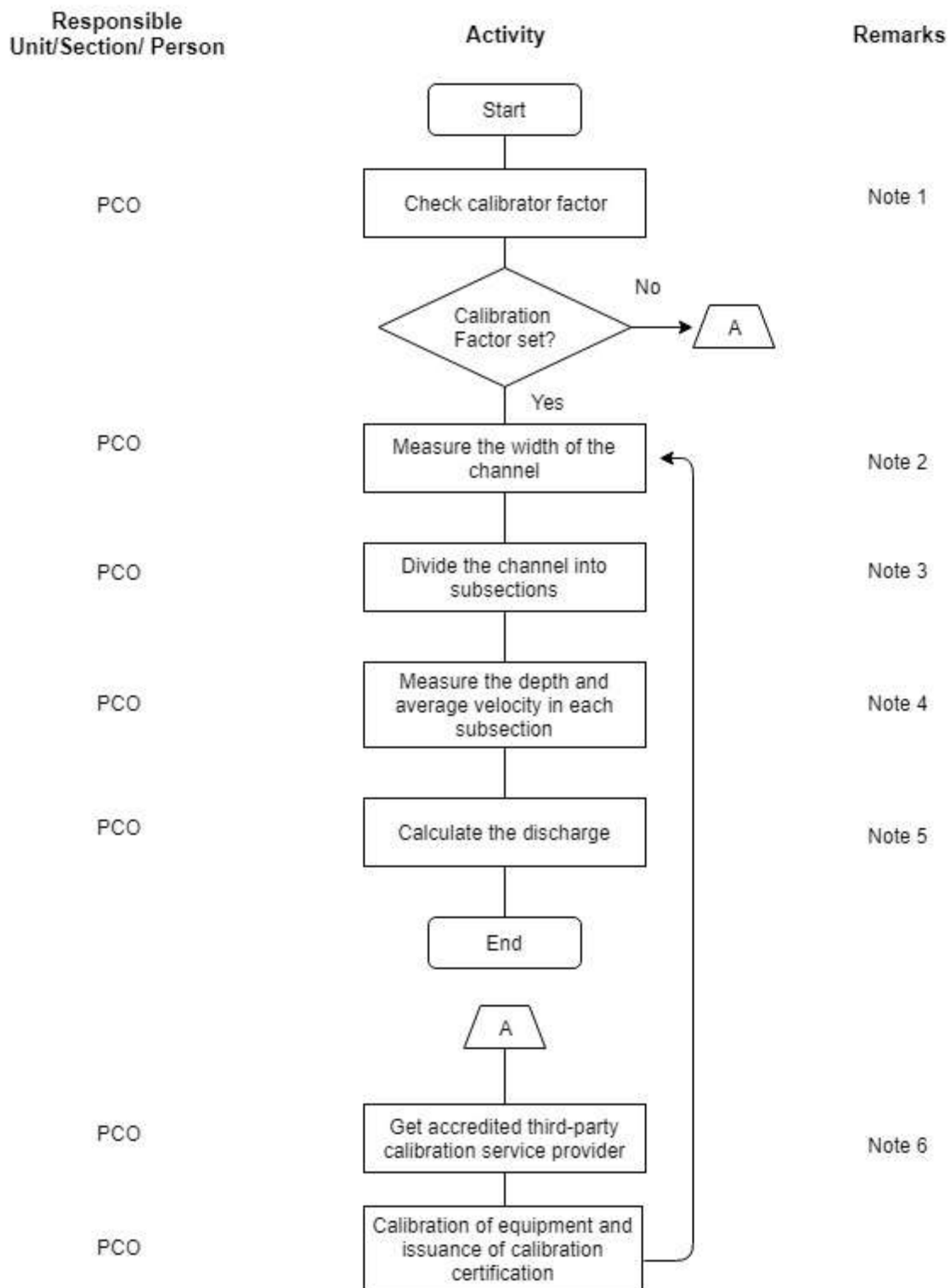
Note 15: Results

If result still exceeds the DENR standard, conduct another investigation to inspect areas that might have been overlooked that significantly contributed to the exceedance.

Note 16: Report to EMB Regional office

If result is already within the standard, the PCO will be reporting again to the EMB Regional Office to document the mitigation activities applied and to inform them that the effluent discharge is already controlled and is within the standard.

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Note 1: Check calibrator factor

Ensure that the flow rate measuring device is properly calibrated prior to use. Check calibration factor (if applicable) in probe's computer. If calibration factor is set (or can be set) as indicated in the unit's manual, proceed to the next process. If not, proceed to process A to for the third-party calibration.

Note 2: Measure the width of the channel

- a. Using a tape measure, measure the width of the channel from one bank to the opposite bank. Start from the point where the bank meets the water and end on the same at the opposite bank.
- b. Ensure that tape is pulled taut.

Note 3: Divide the channel into subsections

Divide the channel into subsections with the aid of tape measure, mark them accordingly. This is to obtain the average depth and average velocity of the channel.

Note 4: Measure the depth and velocity in every subsection. Operate the flow probe as stated in its instruction manual.

Note 5: 1. Calculate the discharge using the following formula:

$$\text{Discharge} = WDV$$

Where: W= Width of the channel;

D= Average Depth of the Channel;

V= Average Velocity of the Channel

Note 6: Get accredited third-party calibration service provider

- a. If flow meter cannot be calibrated in-house successfully, seek for a third-party calibrator.
- b. Once successfully calibrated, the Calibration Service Provider will issue a calibration certificate and will send such to our end along with the equipment.

Total Suspended Solids Procedure

Lab Procedures:

Preparing your filters

1) Rinse three filters with 20-30 mL DI to remove any solids that may remain from the manufacturing process. Place the filters in separate, labelled aluminium weight pans, dry them in a 104 C oven for 30 minutes, place them (filter and pan) in a desiccator, and obtain a constant weight by repeating the oven and desiccation steps.

Obtaining the TSS measurement

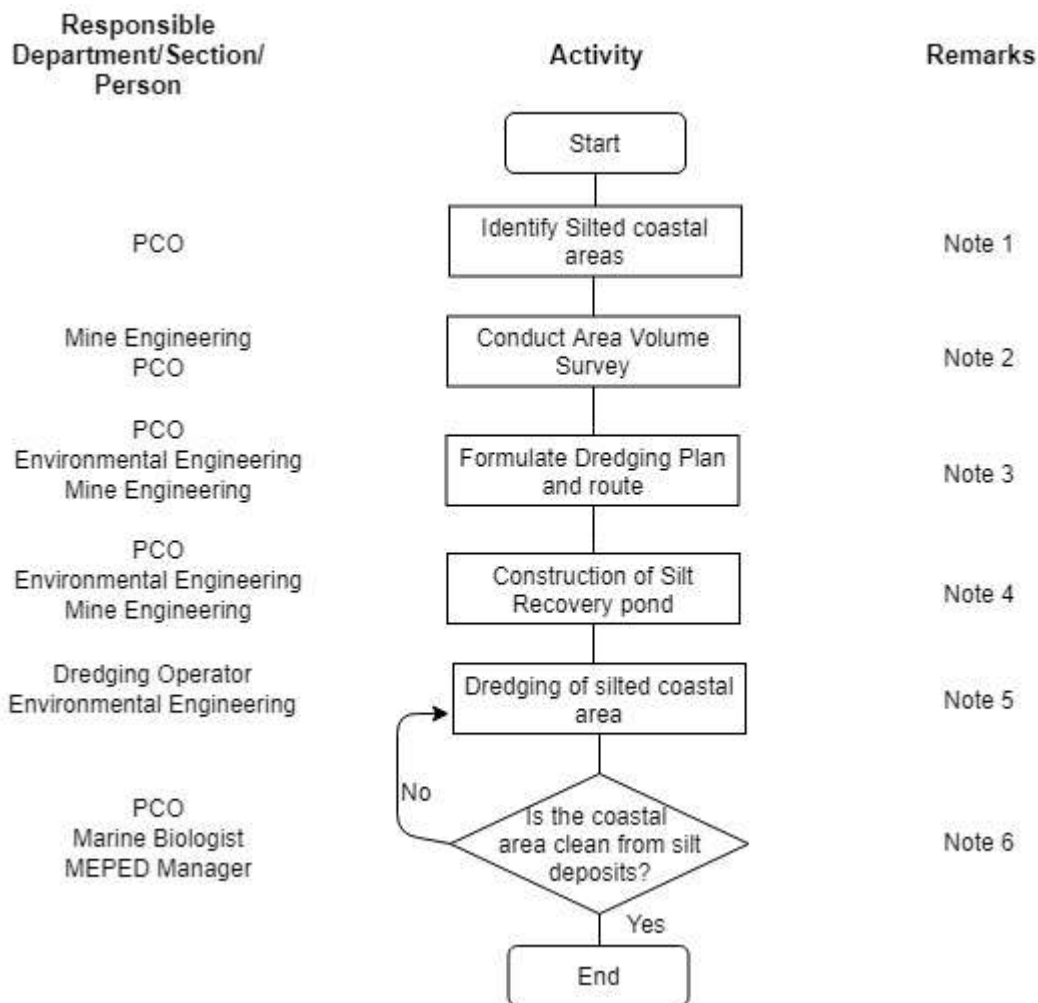
2) Filter 100.mL of sample through each pre-weighed filter.

3) Place each paper in its aluminium weight pan in the 104oC oven for 1 hour. Cool the filter and pan in a desiccator and obtain a constant weight by repeating the drying and desiccation steps.

$$\text{TSS (mg/L)} = \frac{(\text{average weight from step 3 in g} - \text{average initial weight from step 1 in g})(1000\text{mg/L})}{\text{sample volume in L}}$$

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2. Dredging of Silt Deposits



Note 1: Identify silted coastal areas

Identifying the coastal area if discoloration is observed it means the area is silted.

Note 2: Conduct area volume survey

The survey team from Engineering Dept. together with the Environment Supervisors shall conduct a volume survey on the identified area in order to know the volume of silt to be dredged.

Note 3: Formulate dredging plan and route

A dredging plan and dredging route shall be formulated to establish where the dredging machine will start and where to end.

Note 4: Construction of silt recovery pond

A Silt Recovery Pond shall be constructed where the silt recovered from the silted coastal area will be placed in-order to dry the wet silt and will be hauled and transferred

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to the silt stockyard area.

Note 5: Dredging of silted coastal area

Dredging activity will be conducted immediately in-order to attain the target volume base on the volume survey and Gantt chart schedule of activity

Note 6: Check if the area is clean from silt deposits.

The Envi Team shall conduct a survey on the silted coastal area if there is no more discoloration observed in the area the dredging activity will be stopped and if ever discoloration is observed the dredging activity will be continued.