TERMS OF REFERENCE (TOR) FOR CONDUCTING ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR DEVELOPMENT OF DAGAPELA LOCAL AREA PLAN UNDER DAGANA DZONGKHAG

This terms of reference (ToR) provides the scope and framework for conducting environmental impact assessment (EIA) for the development and operation of Dagapela Local Area Plan (LAP) under Dagana Dzongkhag in line with the environmental assessment (EA) procedure under the Environmental Assessment Act 2000 and its Regulation 2016. The level of detail and analysis should reflect the potential economic, social and environmental impacts of the proposed urban development project and recommend mitigation and management plan for the likely adverse impacts. Further, the assessment should also consider measures to enhance the potential socio-economic benefits of the proposed project. The report prepared on the EA studies conducted in line with this ToR should be submitted to the National Environment Commission Secretariat along with other prerequisite clearances and approvals from relevant stakeholder agencies for review and decision on environmental clearance for the proposed project/activity.

1. Title page

The title page should contain the following:

i. The name and location of the project.
ii. Name and address of the proponent.
iii. Name, qualification and address of the EIA consulting firm.

2. Table of Contents

The title and page number of all sections, abbreviations, maps, plans, tables, figures, and annexure of the EA reports.

3. Executive Summary

A brief description of the proposed project in clear and non-technical language including:

- The objective and need for the project. Explain whether the proposed project has been identified in the Five Year Plan or not, and if yes, what rank the project holds in the plan.
- Summary of project area to be acquired for various appurtenant works and land use pattern within 5Km from the project area.
- Summary of key findings and recommendations of the assessment, including the main environmental, social issues and economic impacts and benefits encompassing cumulative impacts and proposed mitigation and enhancement measures.

- A brief description on how the public was consulted and stating the issues raised, resolved and pending.
- A brief description on an assessment of alternatives to the project, its main components and ancillary components with respect to the location, technical design and other environmental and social components.
- The financial statement including the project sot, funding source and activity schedule for the project.
- Project benefits: The local, regional and national benefits of the project should be explained.
- A declaration stating that the information disclosed in the EIA report is correct.

4. Maps and Figures

- A map (1:50,000) specifying the location of the project.
- A study area map, of 5km radius from the project, indicating features such as locations of human settlements, locations of other industries and other air and water polluting sources.
- A map (1:10,000) showing the land use pattern of the project site and study area.
- A map specifying location of rivers, existing roads, drainage system, protected area boundaries, Dzongkhag HQ, important installations, international border, and existing infrastructure, wherever applicable.
- A contour map (at 2 or 3 m interval) of the project site.
- A map clearly delineating the locations of various monitoring stations (ambient air and meteorology, water, noise and soil), if applicable.
- Layout plan of proposed site indicating the built up areas with covered construction such as buildings, recreational facilities, access/approach roads, landscape, parking spaces, sewage, river training works, public toilets, Industrial Service Centre, Town Hall, retaining walls, underground water boring, reservoir, pump houses and other infrastructures.
- Diagrammatic sketch and layout of the wastewater and sewage treatment plant.
- A layout map showing the municipal and industrial including hazardous wastes disposal site.

- A map (1:10,000) specifying the forest cover in the study area, and marking the presence of migratory corridors, occurrence of any endangered/threatened flora and fauna species and/or plants and animals of economic/ecological importance, if any.
- A map (1:50,000) clearly showing the locations of various monitoring stations (for ambient air, water, noise and soil).
- A map (1:25,000) specifying the areas vulnerable to floods.

5. Policy and Legal Frameworks

Provide descriptions on the review of existing legislations and policies governing the implementation of the proposed activity and environmental assessment requirements.

6. Project Description

Describe whether proposed land use is as per approved Master Plan/ Development plan of the area. If there is no approved plan, the consent from appropriate authority should be taken and should be submitted for Environment clearance.

Provide the following essential project related information:

6.1.Details of Project Site and Proponent

(a) Location :
(b) Gewog :
(c) Dzongkhag :
(d) Name of proponent :
(e) Present mailing address including telephone number, fax, and email (if any):
(f) Name and contact address of the environmental focal person:

6.2.Resource requirement

- Details of the process/activities (with flow charts, wherever applicable) involved in the project, including the technology to be used. The EA should justify the selection of the technology with reference to resource conservation (energy and water) and pollution potential.
- Provide the following details:
  (a) Total site area
  (b) Total built up area (provide area details) and total activity area
  (c) Connectivity outside the LAP, utilities and transportation networks and community facilities
  (d) Parking requirements

(e) Total water requirement (both construction and operation phase)
(f) Sewage treatment Plant
(g) Total area for recreational activities
(h) Total area for Industrial Service Centre
(i) Power requirements, associated infrastructures and the distribution lines.

- Describe the list of raw materials to be used, their daily consumption, sourcing, and methods of storage.
- Describe, if any, hazardous chemicals, toxic or inflammable substances to be used, their quantities and storage methods. The material safety data sheet of each individual hazardous chemical should be annexed with the EIA report.
- Description of utilities and services, their capacities, and raw material requirement, if applicable.
- Details of energy sourcing and total energy requirement: If a captive power is proposed, the EIA report should provide the following details: capacity, daily or annual fuel consumption, pollution potential and its management plan.
- Water requirement: This will include sourcing of water, quantities sourced, and daily water consumption in kilolitres per day, quantity of effluents generated, ground water reservoir, groundwater recharge rate and quantity of wastewater recycled/reused and discharged.
- Details of the workforce to be employed in the project and the working hours

6.3 Activities for site preparation

Information on existing land use patterns in the study area

- Area acquired for the proposed project and the land use patterns at the project site and study area, with explanatory notes.
- Land ownership patterns of the acquired land.
- Details of the topography of the study area, and local area hydrology.
- Details of water bodies such as lakes, ponds, springs, streams, natural drains and rivers in the study area and their distances from the project site.
- The boundaries of the nearest human settlement and its distance from the project site.
- Presence of any industries in the study area, including the names, products manufactured, distances from the project site, etc.

- The flood plain boundary/flood prone area: The EA should prepare flood hazard zonation mapping scale indicating the peak and lean season river discharge as well as flood occurrence frequency, if applicable.

- Presence of sensitive areas (if any) such as forests, national parks, historical or archaeological sites, residential areas, parks or playing fields, tourist resorts etc. in the study area and their distances from the project site.

6.4 Baseline data

- Data on ambient air quality: This should include parameters such as PM10 and gaseous pollutants, and site-specific information on existing meteorological conditions such as temperature, humidity, rainfall and wind speed and direction.

- Details of forest land diverted (if applicable).

- Ambient noise data at the project site, including the processes/ operations/ activities that are likely to generate noise. Information should also include areas likely to be affected by noise as this is crucial from the occupational health point of view.

- In case treated effluents are disposed off in water bodies such as rivers or natural drain, then the water characteristics of the receiving water bodies, including details of downstream competitive users, if applicable.

- If treated effluent discharged in the river, the lists of aquatic flora and fauna present in the river.

- Information on potential sources (point and non-point emissions) of air pollution, including fugitive emissions from processes, material handling, storage sites and other sources that may generate fugitive dust.

- Information on probable sources of stack emissions, if applicable – the number of stacks, their diameter, exit temperature and flow rates, and the proposed pollutant concentration from the stacks including the type of pollution control equipment.

- Details of the quantity of municipal/hazardous wastes and sewage likely to be generated.

- Information on estimated quantity and quality of effluents to be generated – quality of both treated and untreated effluents: The data should include information for parameters like Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), heavy metals, fecal coliform and toxic chemicals.

- Detailed information on existing natural drainage/run-off patterns at the project site and in the study area.
- Estimation of groundwater flow in the study area, including the depth of groundwater in different seasons and aquifer characteristics.
- Characteristics of topsoil, its thickness and estimates of total quantity of topsoil to be produced during land clearing; the EA should discuss the management plan for topsoil conservation and utilization in the EMP.
- Inventory of flora and fauna present at the project site and in the study area
- Surface and sub-surface water characteristics in the study area.
- Details of existing socio-economic status of the study area such as population density, human population in the study area, economic profiles, literacy rates, common diseases, and infrastructure facilities available in the study area (such as conditions of roads, hospitals, educational institutes, water supply and sanitation) including displacement due land acquisition, if applicable.

6.5 Impact assessment

- Impacts of the construction phase of the project on ambient air, ambient noise, existing infrastructure and social structure.
- Impacts of the project operations and allied activities on ambient air quality.
- Impacts of fugitive emissions on workers and local community.
- Impacts of the project on water availability and quality of ground and surface water resources. If the project discharges its effluents into surface water bodies such as rivers, then the impact of this discharge on the quality of the receiving medium and its aquatic life.
- Impact of project on local area hydrology
- Impact of storm water on water bodies
- Impacts of noise on workers and the local community.
- Potential activities/operations likely to cause an impact on land.
- Impact of municipal, sewage and hazardous waste on land and water sources.
- Impacts on biodiversity: terrestrial and aquatic ecology (if any).

- Socio-economic impacts of the project.

Risk assessment

- Identification of risk-prone areas based on potential risks and mitigation measures for the same.
- Identification of processes/operations that have the potential to impact onsite/offsite emergency, if applicable.

7. Mitigation and Environmental Management Plan (EMP)

The EMP should discuss the mitigation measures to be taken against each impact, the timeline for completion, the responsible departments for implementation, the budget, post-monitoring provisions and the process of reporting to the concerned regulatory authority.

- Proposals for environmental management during initial stage of project construction, e.g. erosion and sediment control systems, noise and dust mitigation strategies, etc.
- Details of water pollution control, including justification of selection of treatment schemes, design criteria, size of treatment units and final discharge characteristics; tentative costs of the treatment plant, recurring expenditures and details of reuse of treated wastewater and efficiency of the wastewater treatment plant (the treated wastewater should confirm to prescribed national standards), if applicable.
- Information on air pollution control technology for reducing point source emissions, including justification of the selection of pollution control equipment (PCE), technical specifications of the PCE, its efficiency, tentative costs, recurring expenditures including the height of the stacks with justification, if applicable.
- Detailed management plan to reduce fugitive emissions during raw material and product handling, loading/unloading operations, transportation and storage -- this should be provided along with proper timelines and budgets. The project should also discuss the levels of mechanization incorporated in raw material and product handling, to ensure fugitive emissions remain well within the permissible limit.
- A mitigation plan to control run-off from raw material storage yards. Provisions for covered storage yards for raw materials and products.
- Provisions for covered conveyor, bucket elevators or pneumatic transportation, wherever applicable.
- Details of mitigation measures for noise control, including noise abatement from equipments, operations and traffic.

- Detailed management plans to improve the road network or existing roads to meet the projected traffic densities.
- Details of energy and water conservation measures.
- Detailed mitigation measures for the augmentation of groundwater resources.
- A detailed mitigation plan for biodiversity protection and conservation (if the project is likely to impact biodiversity).
- Detailed management plan for municipal, sewage and hazardous wastes, including information on design, leachate collection and treatment systems, in case a hazardous waste disposal facility is proposed at the project site, if applicable.
- Mitigation measures to prevent land and water contamination from raw materials and chemical storage site, if applicable.
- Details of the plant storm water collection and treatment system.
- A flood management plan to protect the plant and surrounding areas, if applicable.
- A plan for emergency preparedness, if any -- details of the expenditure to ensure safety and occupational health of the workers.
- Plan for the green belt development.
- Details of the parking spaces, and provision for canteen and rest rooms for workers and drivers.
- Road safety measures planned to reduce road accidents.
- Best practices such as color coding and labelling cleanliness to ensure safety and environmental compliance.
- The organizational set-up and requirement of manpower for environmental, health and safety management, including clear responsibilities.
- Documentation of impacts that cannot be mitigated, with proper reasons.
- A water assistance plan for the local community, in case it is affected by pollution or scarcity of water resources due to the plant's operations, if applicable.
- Frequency of training and awareness programmes on environment and safety, and the annual budgets allocated for them.

8. Mitigation and EMP for socio-economic impacts

- Preparation of a resettlement and rehabilitation plan (R&R), if displacement is involved: The plan should include details of the compensation provided, including land-for-land compensation, employment or money; provisions at the resettlement colony (such as basic amenities including housing, educational facilities, infrastructure and alternate livelihood potential); a clear timeline for implementation; responsibility; budgets; grievance mechanism, etc.

- Public hearing issues raised and commitments made by the project proponent on the same should be included EIA reports in the form of tabular charts.

- The R&R plan should assess and take into consideration the impact of displacement on women and vulnerable communities such as landless laborers, tribal, etc., and prepare a detailed management plan to improve their status.

- A detailed compensation package for the community that is likely to lose its livelihood.

- Detailed EMP for improving and enhancing socio-economic conditions in and around the project site and the budgetary provisions

9. Environmental Monitoring Program

This section of the ToR must outline how the monitoring plan of Project construction and operation will be elaborated. The Report should clearly specify the nature of the monitoring required, stipulating who should undertake these activities, the cost and any other necessary inputs. The time schedule for monitoring should also be specified. Provide a comprehensive plan covering the environmental and social variables to be monitored, and provide the location and timing of sampling and measurement of the variables. Include baseline, compliance and impact monitoring and indicators to be measured for each of them. Name the institutions responsible for monitoring the different variables and show how the management plan is expected to influence the operation of the project. Provide sufficient guidance and prepare a 'training needs assessment' on sampling protocol and analytical standards to ensure the generation of reliable data.

In order to ensure implementation of the environmental management plan during project implementation and execution stage, the project management should spell out detailed plan to conduct environmental monitoring as follows but not limited to:

- Mechanism of self-monitoring for compliance with environmental regulations.
- Monitoring of quality of water, air, noise, vibration and occupational health status of project personnel and surrounding habitations.

- Description of the administrative aspects and Planned monitoring program to evaluate the effectiveness of various / specific aspects of technological / mitigation measures.
- Environmental audit of various activities including budgeting and financial management with reference to environmental management.
- Groundwater monitoring for the entire life of the project.
- Analysis of data, its interpretation and evaluation of any additional studies to be carried out if required.
- Closure/Decommissioning Plan for the project activities along with the fund requirement for implementation of the activities.

10. Additional Studies

This section contains a description of any other major studies that may be undertaken in support of the preparation of the EIA. If formal studies on environmental valuation and environmental risk assessment have been undertaken as part of the EIA, these need to be included.

i. Environmental Valuation

Environmental Valuation provides means of assessing the benefits of environmental conservation and its contribution to the national economy. Based on such study, the benefits of the proposed Project and environmental conservation can be compared and decisions could be made accordingly. Therefore, this part of the study should assess the economic value of the conservation and protection of environment in the proposed Project area and comparison of benefits with the proposed Project should be presented.

ii. Environmental Risk Assessment

An environmental risk assessment may be a necessary part of the EIA if there is considerable uncertainty about the likelihood or the magnitude of environmental impacts. The data collected during the basic EIA studies provides much of the information needed for explicitly dealing with the uncertainties relating to environment impacts. There are two major categories of risk: 1) those to human health, and 2) those to ecosystem integrity. The primary goal of environmental risk assessment is to evaluate risks, their monetary costs, the costs of emergency response and/or avoidance of risk.

Environmental risk assessment studies require a high degree of scientific and mathematical rigor and may be costly if not properly planned.

iii. Greenhouse Gas Emissions

The management to present the project's potential to greenhouse gas emission.

Accordingly, the volume of CO_2 emissions that will be emitted. This section should give direction to Project's viability and accession as a CDM Project.

11. Response to Comments

A response to each comment received on the environmental assessment should be included in a separate appendix, unless this section clearly explains the location and response to each comment.

12. Annexure

Provide the following annexure.

- Applications for EC for all the ancillaries' facilities, such as power line connection, approach road, water abstraction and supplies, permanent and temporary colonies, Concrete Batching Plants, Aggregate Processing Plant, labour camps and offices, etc as per the existing guidelines May 2012. If specific guidelines are not available, please refer the "Environmental Assessment General Guidelines May 2012" available on NECS web www.nec.gov.bt .
- A presentation of detailed technical data to the extent necessary to keep the main text of the environmental assessment report clear and readable. The main text of the environmental impact assessment shall refer to and summarize any information contained in any annexure.
- A copy of forwarding letter along with TOR duly approved by NEC Secretariat.
- Curriculum Vitae of the EIA Team members.
- List of all regulatory approvals, clearances and No Objection Certificates (NOC) required for the project and their status.
- All stakeholder clearances and approvals.
- Copy of Minutes of all consultation meetings.

NOTE:

- *The Proponent should maintain consistency and accuracy in the report and no subjective statements shall be accepted.*
- *The Proponent shall be responsible for undertaking any other related study desired by the NEC during the process of environmental clearance.*

- *The EIA report shall include all other necessary documents such as clearance from respective Dzongkhag Administration, Department of Forest and Park Services, evidence of public consultation, etc.*
- *A soft copy of the report including all the annexes, maps including Google Earth images/maps, GIS data, etc. needs to be submitted along with the hard copy of the report.*