PROJECT DESCRIPTION

for

SCOPING

19MW Ilaguen Run-of-River Hydropower Project

Barangay Tappa, San Mariano, Isabela

ISABELA POWER CORPORATION

Table of Contents

1. PROJECT FACT SHEET 3

2. Project Background and Information 4

2.1 Project Background 4
2.1.1 Project Owner 4
2.1.2 ECC History 4
2.1.3 Project Rationale 5

2.2 Project Location 6
2.2.1 Location 6
2.2.2 Accessibility 7

2.3 Project Components 9
2.3.1 Project Layout 9
2.3.2 Major Components and Alternatives 11
2.3.3 Project Size 12
2.3.4 Manpower 12
2.3.5 Project Value 12
2.3.6 Project Site Considerations 13

2.4 Description of Project Phases and Activities 15
2.3.1 Pre-development Phase 15
2.3.2 Construction Phase 15
2.3.3 Testing and pre-commissioning 16
2.3.4 Operation Phase 16
2.3.5 Abandonment Phase 17
2.3.6 Restoration after Cessation of Project Operation 17
2.3.7 Time Frame of the Project 17

2.4 Current Status of the project 19

2.6 IMPACT AREAS 0

1. PROJECT FACT SHEET

Project Proponent	**Isabela Power Corporation**
Office Address	8th Floor Unit 8-A Inoza Tower 40th st., Bonifacio Global Coty,Taguig City, Philippines, 1634
Contact Person	Rodolfo A. Romarate II
Office No.:	(632) 893 3426
Authorized Representative for ECC Application	Simmons Consult International Office Address: Unit 2 3C C&B Circle Mall, Liwasang Kalayaan ave., Marikina Heights, Marikina City Contact details: (02) 8405-2152
Project Name	19MW Ilaguen Run-of-River Hydropower Project
Project Location	Sitio Diwago, Barangay Tappa, San Mariano, Isabela
Project Components	Weir, Intake, Penstock, Powerhouse with Electro-Mechanical Equipment, Tailrace, Transmission Line, Access road
Project Type	Hydropower Facility (run-of-river type)
Project Size	88,200 sq.m.
Diversion Method	Weir type
Catchment Area	318 sq.km. (above intake)
Design Flow	11.5 – 70.3 m^3/s
Conveyance Pipeline	3 penstocks of 3.3-m diameter; 58 meters in length
Generating Capacity	19MW
Net Annual Generation	85 Million kWh
Transmission System	69.5 km long; 69kV 3-phase transmission line
Timeline (Construction)	2 years
Construction Budget	PHP 1,899,352,000 (civil construction works)
ECC Application	Amendment

2. Project Background and Information

2.1 Project

The 19MW Ilaguen Hydropower Project Site 1 is the first out of the four cascading Ilaguen Hydropower Projects and it is in the downstream area of the Ilaguen River. The feasibility of various schemes of the project have been studied at the feasibility level and the 19MW Ilaguen Hydropower Project Site 1 is understood to have been initially studied by the Philippine National Power Corporation (NPC). The most recent feasibility study was undertaken by Vergel 3 Consult in 2011.

The Project has an existing ECC with reference number ECC R02-1102-0001(a) issued on September 12, 2012. On October 11, 2012, the Proponent was granted with another ECC with Reference Number R02-1307-0085 for the construction of its 10.89-kilometer access road / road right of way utilizing the old logging road at Sitio Diwagao, Barangay Tappa, San Mariano, Province of Isabela. The Project however will execute few changes other than the current ECCs had stated. As mandated by DAO 03-30, changes or amendment in existing ECC may require an Environmental Performance Report and Management Plan (EPRMP).

2.1.1 Project Owner

The proponent, Isabela Power Corporation is a corporation duly organized and existing under the laws of the Philippines. It is registered under the securities and exchange commission whose primary purpose is to construct, finance, operate electrical power generation, distribution, transmission, facilities, systems and other matter related to but not confined to energy related projects; to enter into contract agreement and transaction with foreign and domestic government and private entities and organization and to market these, along with other products and services to any legitimate organization.

2.1.2 ECC History

Environmental Compliance Certificate (ECC) is a certification issued by the Department of Environment and Natural Resources entails the measures and conditions that the project proponent has to comply or undertake during the construction, operation and even until the project's abandonment phase. This is to identify the possible impacts of the project and to ensure that these impacts can be mitigated through feasible and effective management strategies which will be incorporated in the Environmental Management Plan.

The 19 MW Ilaguen Run-of-River Hydropower Project of Isabela Power Corporation has been issued by the Department of Environment and Natural Resources – Environmental Management Bureau through Region 2 Office an Environmental Compliance Certificate with reference number ECC R02-1102-0001(a) issued on September 12, 2012. On October 11, 2012, the Proponent was granted with another ECC with Reference Number R02-1307-0085 for the construction of its 10.89-kilometer access road / road right of way utilizing the old logging road at Sitio Diwagao, Barangay Tappa, San Mariano, Province of Isabela. The Project however will execute few changes other than the current ECCs had stated. As mandated by DAO 03-30, changes or amendment in existing ECC may require an Environmental Performance Report and Management Plan (EPRMP). EPRMP provides the environmental impacts associated with the project. It entails the environmental management plans and their effectiveness.

2.1.3 Project Rationale

As reported in the Power Development Plan (PDP) for 2009-2030, the government, through the Department of Energy (DOE) has recognized a rapid growing demand for power in the Philippines. The DOE estimated that energy consumption in Luzon Grid will increase at 4.53 percent annually over the 2009-2018 timeframe. However, in the year 2010, actual energy consumption for Luzon had increased by more than eight percent. It has been estimated that 1,200 MW of additional generating capacity needs to be built between 2012 and 2016 to meet the projected power demands. In recognizing the country's need for energy development, there has been a shift of tapping rivers as potential for power generations. By means of utilizing hydropower is to take advantage of the probable energy availability in the many lakes and rivers of the country. It is also a known fact that hydropower generation is one of the cleanest sources of electric power. As compared to large projects, small hydroelectric generating stations have the least possible impact to the environment since it is considered a renewable energy. The main objective of the 19MW Ilaguen River Hydropower Project Site 1 is to provide a long-term electricity supply that will meet the increasing demand of the region. The project will likewise decrease the regions dependency on the temporary diesel-power facilities that are costlier and can cause more damage to the environment. The secondary objectives that would result from the construction and operation of the hydropower project which will be beneficial to the region and the local inhabitants are:

- To create opportunities for economic development and growth of the locality and the region as well.
- To support the watershed management plan in the area as to help reduces deforestation and to rehabilitate areas that are presently denuded.

2.2 Project Location

2.2.1 Location

The 19MW Ilaguen Site 1 Hydropower Project is situated along the Ilaguen River, and is located within the boundaries of Barangays Tappa and Dicamay, Municipality of San Mariano, Isabela Province (Vergel 3 Consult Feasibility Report, 2011). The project site is within the Northern Sierra Madre Mountains, and can be accessed via 16-km of road and logging track from Barangay Dicamay. It can also be reached through a river navigation via the Ilaguen River from Barangay Tappa. The location of the main components of the project (the weir and powerhouse) are in the following table and map.

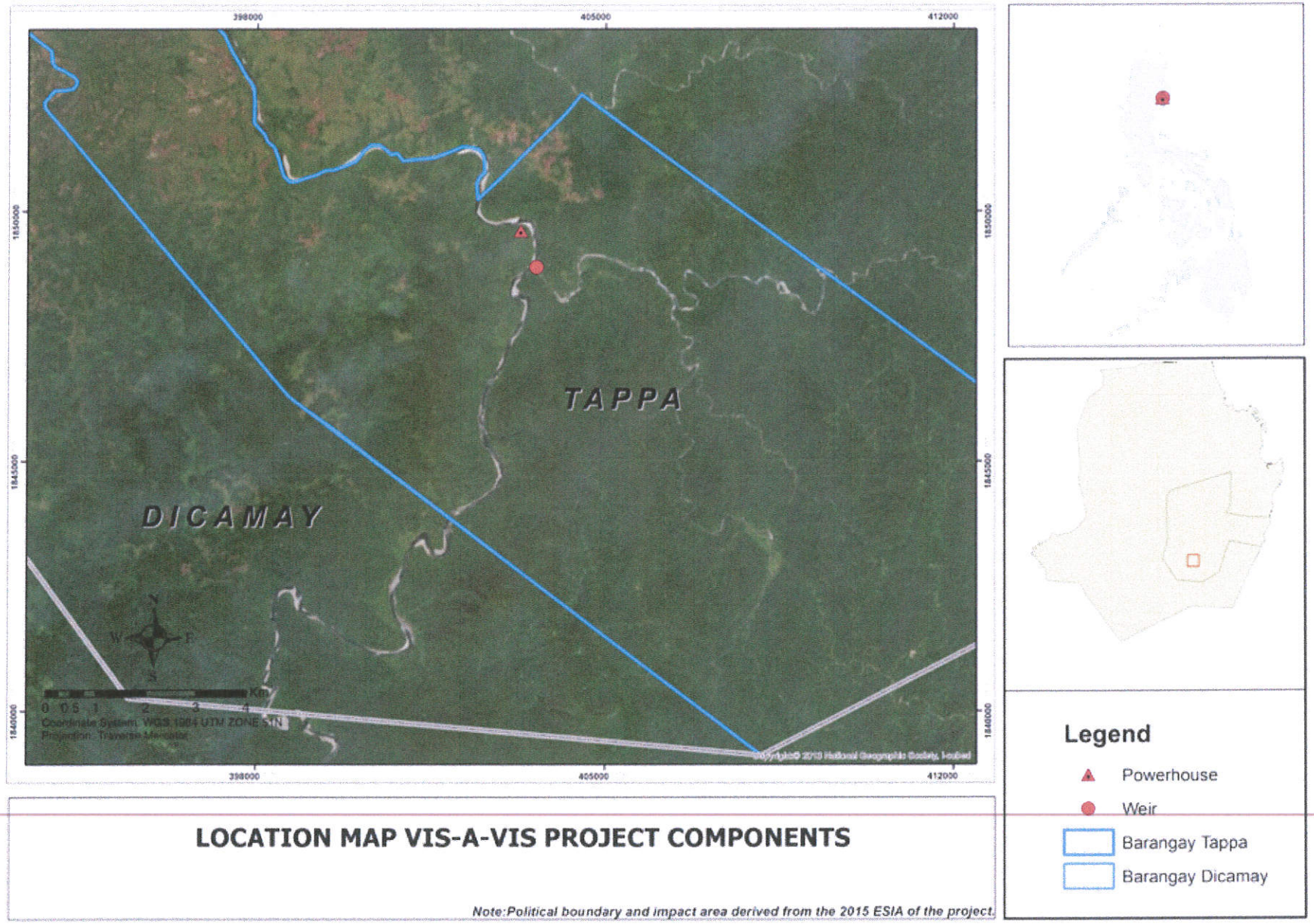
Map 1. Project Location.

Table 1: Geographical Coordinates of Main Project Components

Component	Geographical Coordinates
Weir	Latitude: 16°43'30.88" N Longitude: 122°5'44.07" E
Powerhouse	Latitude: 16°43'30.51" N Longitude: 122°5'40.46" E

2.2.2 Accessibility

Vehicle access to the site will follow the existing barangay roads from the national highway to Barangay Dicamay (some 35 Km), after which the access follows an existing logging track which is 16 Km to the site. The site access requires crossing of two major watercourses (60 meter and 30-meter-long approximately) and several smaller creeks and ephemeral watercourses.

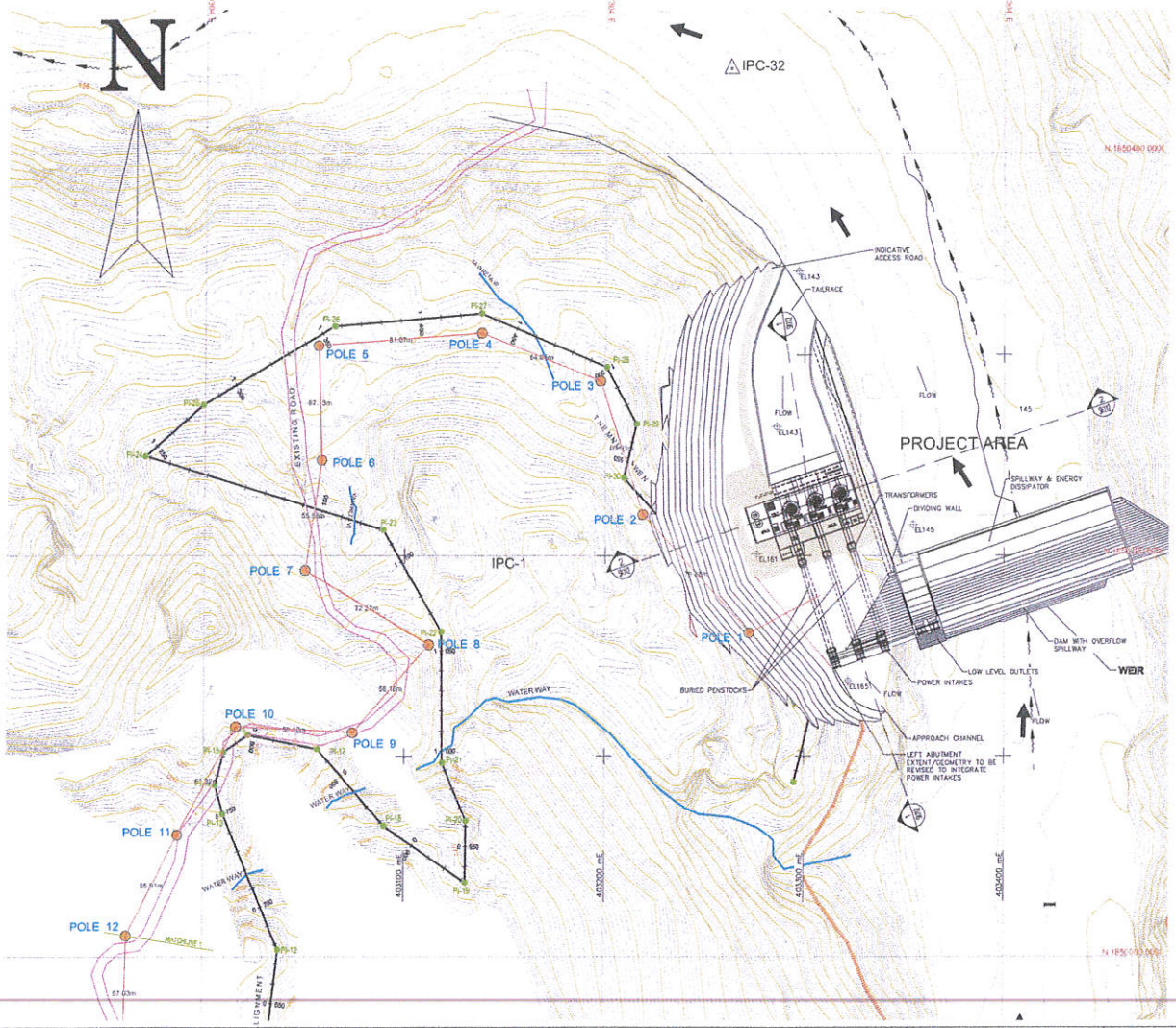


Map 2. Project Location Map vis-à-vis Project Components

2.3 Project Components

2.3.1 Project Layout

The layout of the project and its major components are in the figure below. The project is mainly composed of the 28-meter high weir, intake structure, penstock, powerhouse, substation, transmission line and its access road.



POLE NO.	COORDINATES (PRS92)	
	EASTING	NORTHING
POLE 1	403272.5792	1850161.5082
POLE 2	403218.6569	1850220.4455
POLE 3	403197.3419	1850287.0083
POLE 4	403137.9218	1850310.9284
POLE 5	403056.4437	1850304.5615
POLE 6	403058.2296	1850247.6263
POLE 7	403050.0861	1850192.4559
POLE 8	403112.2462	1850185.5918
POLE 9	403074.2313	1850111.6771
POLE 10	403016.2107	1850114.5709
POLE 11	402967.1987	1850060.5614
POLE 12	402982.2221	1850010.5443

OWNER:	PREPARED BY	PROFESSIONAL ELECTRICAL ENGINEER	CLIENT REPRESENTATIVE	PROJECT TITLE	SHEET CONTENT	REVISIONS	INITIAL	SHEET NO
ISABELA POWER CORPORATION BONIFACIO GLOBAL CITY, TAGUIG CITY	1164 CAYPOMBO, STA. MARIA BULACAN EMAIL ADD: info@ms-electra.com	MARIO L. NICOLAS PRC NO: 00261 DATE ISSUED: 07/07/1988 PTR NO: 0572886 DATE ISSUED: 01/12/2017 ISSUED AT: STA. MARIA BULACAN	**VALERIANO B. INFANTE** Project Manager Isabela Power Corporation 3/15/19	PROPOSED ILAGUEN 1 & 2, 69KV TRANSMISSION LINE ROUTE PLAN Echague - Angadan - San Guillermo - San Mariano	PROPOSED ROUTE PLAN OF 69KV TRANSMISSION LINE	No. / DESCRIPTION / DATE	DRAWN BY: / DESIGNED BY: / CHECKED BY: / APPROVED BY: — SIGNATURE / DATE	01 SIZE: A1 REV.: 00

2.3.2 Major Components and Alternatives

The project site has a total land area of 88,200 m^2 and Estimated Annual Energy of 85 Million KW-hours. The project is composed of different component and they are listed below:

Table 2. Summary of Existing ECC Coverage and Proposed Modifications

Item	Existing ECC Coverage	Proposed Modifications	Remarks
1. Power Output	25 MW	19MW	• Decrease in power output rate
2. Watershed Area	Above Intake: 318 km^2 Total Watershed Area of River: 611 km^2	Above Intake: 318 km^2 Total Watershed Area of River: 863 km^2	• Increase in watershed area
3. Weir	Coordinates: $16^0$43'14.81'' N, $122^0$05'44.65" E Crest Elevation: 300 m^2	Coordinates: 16°43'30.88" N, 122°5'44.07" E, 100m long ogee crest overflow weir Crest Elevation: 176.2 mRL and assumed riverbed elevation at 145 mRL	• Decrease of Crest Elevation • Slight movement of weir location
4. Intake Headrace and Surge Tank	400 m^2	3 individual intake with trashracks, bulkhead gate and hydraulic guard gates. No forebay and surge tank.	Rectification of component description because of the wrong information
5. Penstock	4,500 m^2	3 individual penstocks of 3.3-meter diameter and length of 58 meters.	Rectification of component description because of the wrong information
6. Powerhouse	Area: 1,500 m^3 Three (3) units of turbine: 8 MW Switchyard: 200 m^3 Maximum Plant Discharge: 80 m^3/s Minimum Plant Discharge: 24 m^3/s	Area: 1,500 m^2 Three (3) units of Turbine: 3 x 6.33 MW Switchyard: 700 m^2 Max design discharge: 70.3 m^3/s Min design discharge: 22.5 m^3/s	Rectification of area units from cubic meters to square meters • Increase of switchyard area • Increase of maximum plant discharge • Decreases of minimum plant discharge
7. Buildings (Area)	1,200 m^2	800 m^2	• Decrease in the area of buildings
8. Tailrace Elevation	192.5 m	143.0 m RL	• Decrease of tailrace elevation

9. Impoundment of water	500,000 m^3	Inundation Area: 2.03 km^2 (2,030,000 square meters) Inundation volume: 30,396,316 cubic meters	• Increase of water impoundment and inundation area
10. Transmission Lines	(-)	69.5 km long, 69kV 3-phase transmission line	• Adding details on the component
11. Access Roads	ECC Reference No.: R02-1307-0085 Access Road / Road Right of Way (ROW): 10.89 kms (old logging road) ECC Reference No.: R02-1102-0001(a) New Road Construction: 5 kms Road Rehabilitation: 5 km	New Road Construction: 2.0 km Road Rehabilitation: 15.5 km long, 5.5 m wide	• Cancel the ECC of the Access Road / Road ROW. • The Access Road / ROW with **ECC Reference No.: R02-1307-0085** to be consolidated with the Access-Road component of the ECC of the Project with **ECC Reference No.: R02-1102-0001(a)**
12. Total Area of the Project	10,000 m^2	88,200 m^2	• Increase of total project footprint
13. Estimated Annual Energy	44.60 Million KWh	85 Million KWh	• Increase in the annual energy production

2.3.3 Project Size

The total area of the project site is 88,200 m^2

2.3.4 Manpower

In the construction phase, the estimated manpower requirement is from 200 to 400. The local residents will be given priority to be employed during this phase should they be qualified. The remaining construction personnel will likely live in temporary camps consisting of tents and temporary wood structures. The temporary camps will be dismantled after the project is completed. Full-time security personnel will be employed to ensure safety and prevent any unwanted incident. They will be on duty at all time to provide 24-hours security in 7 days a week.

2.3.5 Project Value

The estimated cost of the project amounts to Three Billion Six Hundred Ninety-Six Million Pesos (PHP 3, 696,000,000.00).

2.3.6 Project Site Considerations

Design Work Prior to Detailed Design Phase

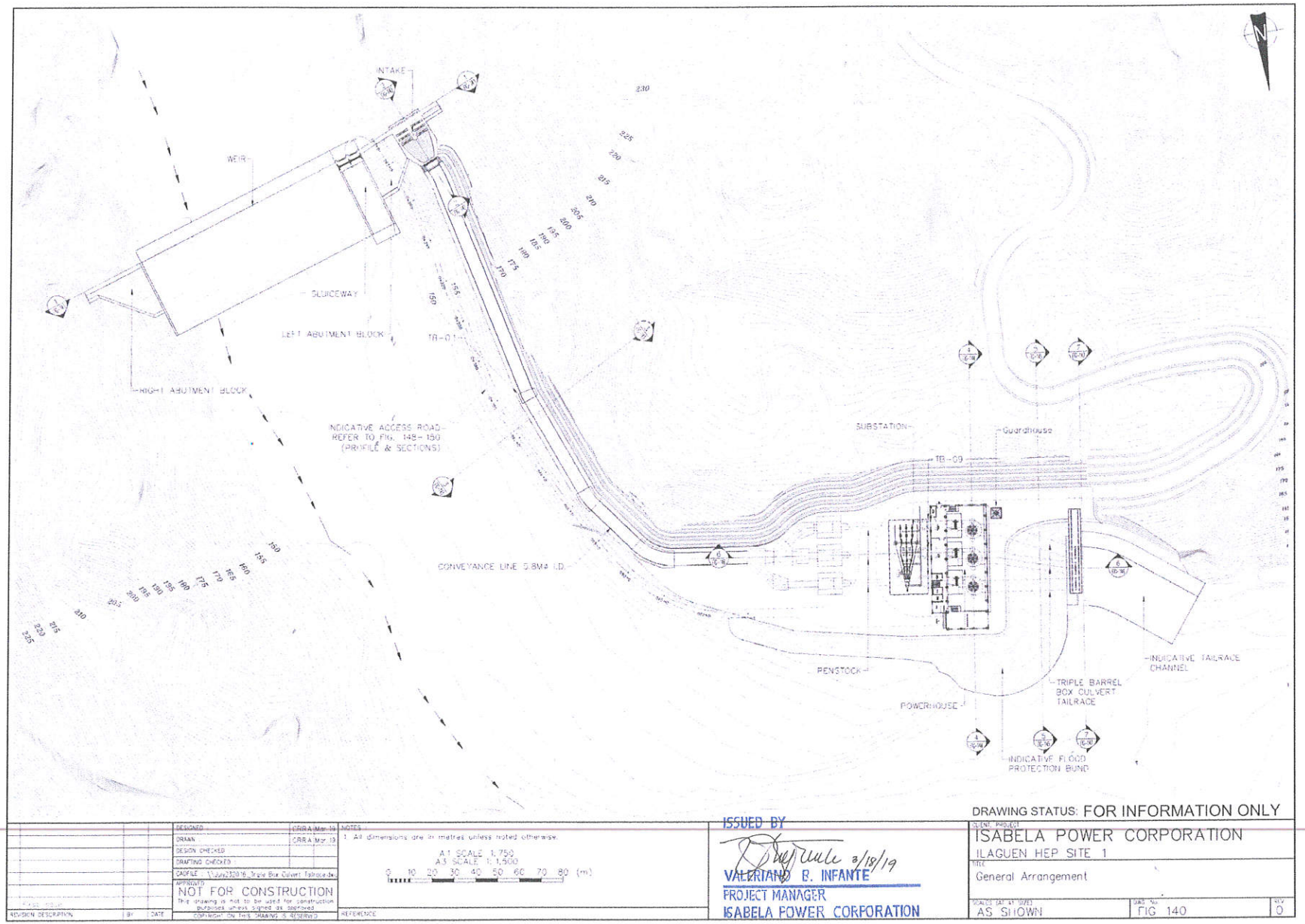
Studies for the development of a hydropower scheme along the Pinacanauan De Ilaguen River date back to the early 1990's. Initial feasibility study previously undertaken was for the National Power Corporation (NPC) prepared by HARZA Engineering Company International LP in 1992. The development scheme was intended for a reservoir operation scheme designed for an 88 MW installed capacity comprising of a high concrete dam. The feasibility study funded by the IPC undertaken by Vergel Consult in October 2011 proposed a 28-m high concrete gravity dam and 360 m long 5.2 m diameter main penstock. Their design flow is 93 m^3 /s and a rated head of 26-m provided for a capacity of 19 MW.

Vergel Consult's feasibility study was reviewed as part of EDCOP's concept design development. The EDCOP concept design included significant changes from the IPC feasibility concept.

EDCOP Concept Design

The EDCOP concept design on scheme layout plans and sections was undertaken after the completion of a comprehensive topographic survey. The generated contour data has defined a more encouraging alternative site for the weir that offers more advantages against the original site. A complete set of revised drawings was provided to IPC in June 2017. The layout plan for this revision is shown in Figure below. Change in slope along the river profile was confirmed to be insignificant indicating that moving the weir nearer to the powerhouse site will not create substantial loss in head. It was evaluated to move the weir some 250-m downstream where geological conditions are comparable with its original site. The movement of the weir results in shorter conveyance length as well as avoidance of the wide gully on the left side formation that could have required an additional bridge crossing structure to support the original conveyance alignment.

A large difference in elevation between the previous and latest contour (the latter being the accurate) data was verified. Elevations of the latest contour data were observed to have dropped by ±20 m on the weir site and ±15 m on the powerhouse/tailrace site. The difference in elevations between the previous and latest contour data would have been tolerable if the drop between the weir and powerhouse/tailrace area was marginally even. However, since this was not the case, the proposed installed capacity would be adjusted based on the available head considering the same scheme configuration and component sizes.



DRAWING STATUS: FOR INFORMATION ONLY

DESIGNED	CRRA (Mar. 19)	NOTES	ISSUED BY
DRAWN	CRRA (Mar. 19)	1. All dimensions are in metres unless noted otherwise.	VALERIANO B. INFANTE 3/18/19
DESIGN CHECKED		A1 SCALE 1:750	PROJECT MANAGER
DRAFTING CHECKED		A3 SCALE 1:1,500	ISABELA POWER CORPORATION
CADFILE: \\July2320\16_Triple Box Culvert Tailrace.dw...		0 10 20 30 40 50 60 70 80 (m)	
APPROVED: NOT FOR CONSTRUCTION			
This drawing is not to be used for construction purposes unless signed as approved.			
COPYRIGHT ON THIS DRAWING IS RESERVED		REFERENCE	

CLIENT, PROJECT	
ISABELA POWER CORPORATION	
ILAGUEN HEP SITE 1	
TITLE: General Arrangement	
SCALES (AT A1 SIZE): AS SHOWN	DWG No.: FIG 140
REV.: 0	

Conceptual Layout

2.4 Description of Project Phases and Activities

2.3.1 Pre-development Phase

The predevelopment phase is as critical as the construction and operation phases of the project. During this stage, every detail of engineering design is carefully studied. This is to determine the suitability of the design to the existing environmental and geological setting and to ensure project's sustainability all throughout its lifespan. To ensure the capability and stability of the ground to hold the project's foundation, thorough geotechnical investigation shall be done on-site.

2.3.2 Construction Phase

A number of activities will be done during the construction period. Most of the construction activities will occur during daytime, at a time when noise level from the construction equipment and machineries can be tolerated by the local residents.

In the areas of the intake structure, at the surge tank, along the penstock route and along the access roads, vegetation will be cleared. Utmost care will be implemented to ensure that disturbance to vegetation will not occur to areas outside of the construction zones.

The General Contractor will establish and maintain temporary facilities to prevent erosion and pollution during construction. The General Contractor is responsible in water sprinkling of exposed soils and / or covering the mounds of stockpiled soils to prevent dust generation.

Sand, gravel, soil, rocks and other materials readily available near and within the project coverage will be utilized for the construction except for forest products such as logs.

Since there is no available power onsite, the project will be using several generator sets.

Table. Summaries of Construction Activities

Construction Activities	Description
General Excavation	In order to construct various civil components of the hydroelectric project, existing soil will be excavated. Excavated soils will be stockpiled in designated areas or will be utilized as fill material. Vegetative coverage of the stockpiled soil or covering with canvas will be done to minimize dust emission.
Access Roads	The access road to the project site will follow the existing logging road. Enhancement of the road is necessary which includes cut and filling in some areas. Excavation cut and fill balance will be undertaken to minimize soil spoils to be disposed. Drainage ditches will be cut along the side of the access roads to carry runoff from the road and direct it to the creeks and rivers. Sediment control measures, in the form of a sediment trap or filter, will be implemented in all drainage ditches to control sediments from entering the natural water bodies.

Concrete Works	Temporary concrete batching areas will be set-up for the duration of the construction period; one near the intake site and one near the powerhouse site. Bags of cement and aggregates such as crushed stone and sand will be stockpiled at each batching area. Materials that could generate dust to wind will be covered by a canvas or stored within a temporary shed.

Equipment installation

Once the initial construction works such as earthworks and civil works are done, turbines and other major components will be installed simultaneously while the construction of the main powerhouse is on-going. On the other hand, the installation of overhead 69kV Transmission Line Project comprises of: preparatory clearing for the installation of steel poles; transportation of steel poles; pole erection; conductor stringing; and grounding of equipment. A 5.0-m width easement will be needed for each of the transmission line, and provision of 2.0 m buffer.

2.3.3 Testing and pre-commissioning

Before the project operates, it has to go through a pre-start up and series of test operation activities, which will involve inspection and check-up of all major components. Moreover, completion of other plant-related activities are done during this phase and training of operating staff onsite are conducted.

2.3.4 Operation Phase

The power plant will be operated at full capacity, 24 hours a day using SCADA. Real-time records of power output will be recorded over the initial years to confirm the operating philosophy of the power plant.

Regular maintenance of the plant will involve lubrication of moving parts, replacement of lubricating oils and filters, replacements of cooling fluids and filters, thorough cleaning of the interior of the powerhouse, manual removal of debris from the intake trash rack, and general maintenance of the civil works. Regular maintenance involving shutdown of turbine will be conducted during the off peak hours, whenever possible.

During non-routine outages, operators will be required to start the power plant and monitor the operation of the plant.

Annual maintenance involving an inspection and repair of the turbine runners will require an extended period of shutdown for the turbine. Annual maintenance will likely occur during the low flow periods when the second turbine is capable of passing all available flow.

No major maintenance items are expected during the initial twenty years of operation. Thereafter, the generator and turbine runners may require rehabilitation or replacement Rehabilitation of the civil works

should be fairly minor during the first twenty years of operation. The life of the power plant is anticipated to be 50 years.

2.3.5 Abandonment Phase

The proponent's responsibility does not only cover the impacts on the construction and operation phase of the project. During the abandonment phase, the proponent will take the necessarily means to minimize the project's impact in the environment and will have to continue implementing various environmental monitoring until DENR certifies the proponent for the completion of waste clean-up and until the area has been restored to its near original state. Prior to decommissioning, the proponent will have to prepare an abandonment plan in accordance with applicable statutory and regulatory requirements.

Removal of Roads

All roads built during the construction period will be used as access roads to the structures and facilities during the operational phase. Depending on the future use of the area, the access roads will be retained or removed during abandonment of the project. In case of access road removal, all demolished materials will be disposed

in the designated landfill area or be given to interested parties while the sites will be revegetated or return to its conditions prior to the project operation.

Relocation and Termination Plans

The lifetime of the power plant is anticipated to be 50 years or longer considering the regular preventive repair and maintenance vis-à-vis the normal wear and tear of the equipment and facilities. Plans for the termination of the project will be made later depending on the assessment and/or expected remaining lifetime of the project.

2.3.6 Restoration after Cessation of Project Operation

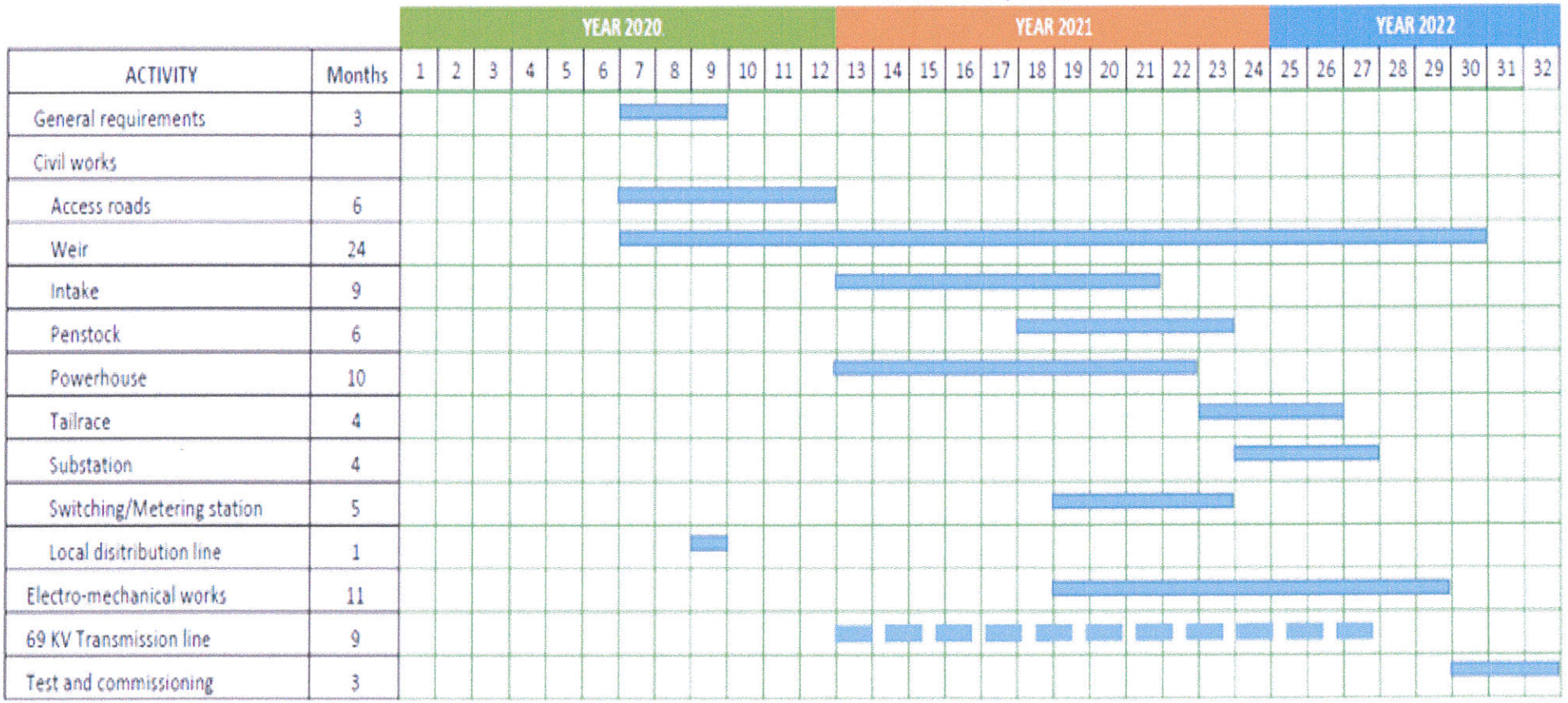
Considering that the expected lifetime of the project is 50 years or more, the plans for restoring the area will be prepared when the management already has schedule for the project abandonment.

2.3.7 Time Frame of the Project

The table below reflects the planned schedule of the activities to be done for the project.

SCHEDULE OF CONSTRUCTION ACTIVITIES

ILAGUEN 1 HEP, ISABELA



2.4 Current Status of the project

The project is currently conducting geotechnical investigation on the access road; the plant site geotechnical work has been completed. The results of this geotechnical testing will be used for the detailed engineering design of the project. Aside from the geotechnical investigation being conducted, the project is currently enhancing the old logging road going the project site.

Plate 1. Portion of the Ilaguen River, Tappa San Mariano, Isabela

2.6 IMPACT AREAS

Hydropower projects such as run-of-the-river harnesses the natural potential energy of water in generating electricity needed by consumers. They don't have reservoirs thereby eliminating methane and carbon dioxide emissions caused by the decomposition of organic matter usually found in reservoirs like dams. This kind of project does not use fossil fuels; fewer greenhouse gas emissions are produced mostly during the construction phase of every component of the project but during operation there is none.

Aside from the emission impact there are other environmental impacts that must be taken into account. The manipulation of river flows such as diversion of rivers can cause a significant number of environmental impacts; it affects how the aquatic ecosystem works, which could affect fish populations and the health of the river overall. However, this effect on fish populations will be mitigated by the construction of fish ladders that could allow fish to move through the system without being harmed or having their migration routes interrupted. As well, the changes in the river basin,water composition could increase species mortality, disrupt migration, or cause an imbalance in biodiversity. Thermal pollution and increased turbidity of the exiting water are possible side effects of sending water through turbines and back into a river.

In accordance with the Revised Procedural Manual (RPM), Sec 3.a, the Direct Impact Area (DIA) is initially delimited at the pre-EIA stage as "the area where ALL project facilities are proposed to be constructed/situated and where all operations are proposed to be undertaken." Moreover, the RPM states that the Indirect Impact Area (IIA) during the pre-EIA study stage can only be assumed or qualitatively estimated but may be guided by secondary data and key information from key interviews of local authorities. The table below initially identifies the direct and indirect impact areas of the project.

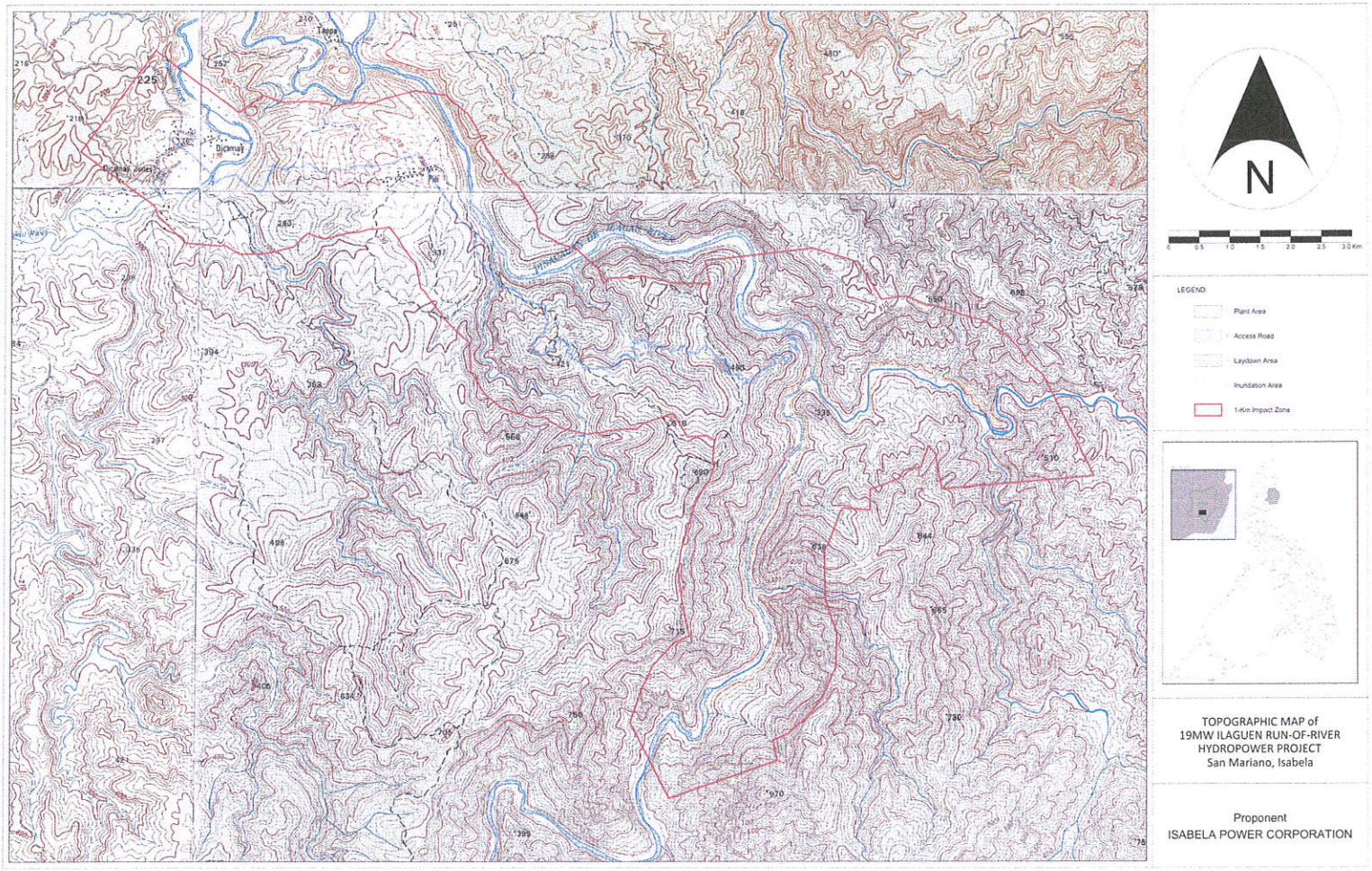
Table : Impact Areas of the Project

Area Classification	Area Coverage
Direct Impact Areas	**In terms of biophysical impact:** • Ilaguen River • conveyance facility • Location sites of the surge tank, powerhouse, etc. • Access road leading to the site • Inundation area
	In terms of socio-cultural impact: • Residents and IP community of Tappa and Dicamay being the nearest community that will benefit from the project's Social Development Programs (SDPs) and Corporate Social Responsibility (CSR) activities.
Indirect Impact Areas	**In terms of biophysical impact:**

Area Classification	Area Coverage

	• 500-meter radial zone of the following:
	  ○ Ilaguen river
	  ○ 4.6-km conveyance facility
	  ○ Location sites of the surge tank, powerhouse, etc.
	  ○ Access road leading to the site
	  ○ Inundation area

	In terms of socio-cultural impact: • Residents and IP communities of the other sitios of Barangay • Other barangays in San Mariano • Other municipalities/cities in the province of Isabela



Topographic map of the whole project indicating the impact areas.