TITLE

BRTP Grand Passage MRE Permit

12.0 SUPPORTING INFORMATION

12.1 INTRODUCTION

Black Rock Tidal Power Inc. (BRTP), and its partners SCHOTTEL Hydro, Sustainable Marine Energy (SME) and Sustainable Oceans Applied Research (SOAR), wish to conduct an off-grid demonstration of the 280kW PLAT-I tidal energy platform at Grand Passage, located between communities of Westport and Freeport in Digby County, Nova Scotia. The proposed demonstration will be the first North American application of the technology. PLAT-I had a successful inaugural deployment in Connel, Scotland throughout late 2017 and the first half of 2018. For the proposed project, this prototype will be brought to Nova Scotia, assembled, and transported by sea to Grand Passage where it will undergo testing according to a pre-determined schedule for a period of a minimum of three months beginning in late Summer and into Fall 2018.

The Grand Passage location has the great advantage of having strong tidal currents and shelter from open ocean waves but also allowing easy access to the platform. The water clarity and visibility at Grand Passage is also good. These site characteristics create the ideal test location for technology development and proving while also affording an opportunity for key stakeholders to observe and visit the platform. In addition to assessing and proving the engineering performance of the system, the deployment will also provide ample opportunity to conduct environmental monitoring to detect marine life such as fish and marine mammals and assess any interactions they may have with the platform. Through this project BRTP and its partners intend to continue progressive development of community and utility-scale floating tidal energy devices that can be installed in rivers and tidal currents around the world to provide clean, renewable electricity for remote communities, industrial facilities, and utilities.

12.2 PROJECT PARTNERS

This project brings together a number of leading companies and entities in the tidal energy sector in Canada and internationally:

Black Rock Tidal Power, based in Halifax, Nova Scotia, is a tidal energy project developer which employs a group of highly skilled professionals with extensive relevant experience to execute a tidal project. BRTP has built up a significant knowledge with respect to supply chain for platform and component fabrication worldwide and in Atlantic Canada. BRTP is the proponent for the proposed project at Grand Passage.

SCHOTTEL Hydro manufactures the SCHOTTEL Instream Turbine (SIT) which is used in all SME projects to generate clean energy from tidal and river currents. The SIT features a modular system including a passive-adaptive fixed pitch rotor, a high power-weight ratio drivetrain and a power conversion system on board. Rotor blades are available as 4m and 6.3m diameter, depending on the flow velocity at the chosen deployment site.
SCHOTTEL HYDRO is located in Spay, Germany, along with the headquarters of its parent company SCHOTTEL GmbH.

Sustainable Marine Energy, based in Edinburgh, Scotland, is a renewable energy company specialising in providing integrated tidal energy solutions for the generation of clean energy from tidal and river currents. SME understands the challenges faced by the offshore renewable energy sector and works to ensure that low cost installation and maintenance operations can be achieved throughout all stages of the project life cycle. SME supplies integrated tidal energy systems on an EPIC (Engineering, Procurement, Installation, Commissioning) basis, whilst also entering into long term contracts for the operation and maintenance of the equipment it installs on behalf of clients. SME does this with the backing of industrial partner and shareholder SCHOTTEL HYDRO, who are also the supplier of the tidal turbine equipment.

Sustainable Oceans Applied Research (SOAR) is a federally registered not-for profit organization with a base of operations in Freeport (Nova Scotia), and an immediate focus to help evaluate the potential for community-scale tidal power systems to supply sustainable energy to rural coastal communities. SOAR is assisting with access to the test site in Grand Passage, including contribution of local knowledge, relationships, services, and additional assets to the project. This helps to enable the opportunity for BRTP to follow a step-wise approach to development in Nova Scotia, including the ability to conduct effective environmental monitoring in a highly visible and easily accessible location, which is ideal for cost-effective technology development and research activities. SOAR also brings academic partners, such as Acadia and Dalhousie Universities alongside the project.

12.3 PROJECT OVERVIEW

The proposed project will entail a temporary, non-grid connected deployment of the PLAT-I floating tidal energy convertor in Grand Passage for a period of a minimum of three months. The objective of the project is to conduct a test program to demonstrate and prove PLAT-I performance in Nova Scotian tidal conditions. A second objective is to trial a variety of environmental monitoring technologies and techniques to investigate interactions between PLAT-I and marine life. The project will also contribute to the development of local and regional capacity with regard to development and operation of tidal energy projects.

The proposed deployment is a crucial 'stepping stone' for future commercial projects in Nova Scotia, including at the FORCE test site, and beyond. This project will seek to address key technical and environmental challenges and to establish a track record of successful operation in Canada – this will provide a level of comfort around the technology for Federal and Provincial regulators and the broader stakeholder network prior to installation of larger projects. This project aligns well with Nova Scotia's plans for tidal energy. In early 2018, the Province enacted the Marine Renewable Energy Act, which created a permitting system to allow tidal energy devices to be demonstrated in the Bay of Fundy. BRTP is following this process to demonstrate the PLAT-I technology while respecting local needs and environmental considerations. Throughout the project BRTP will maintain its Halifax-based team and augment that team with field technicians who will be stationed at Grand Passage to operate, monitor and maintain the platform.

12.4 TECHNOLOGY OVERVIEW AND PROPOSED LOCATION

The 280kW PLAT-I platform is 32 metres long, with a beam (width) of 27 metres, and hosts four SCHOTTEL HYDRO SIT250 turbines equipped with 6.3m diameter rotors. The platform's modular design can be broken down for shipping and assembly close to site, the shallow draft configuration also permits launch and tow out with limited port infrastructure. A mooring turret located near the bow of the platform allows the system to rotate 360 degrees with the natural variation of the tidal current and passively align with the flow. The turbines have been configured for maximum power extraction in shallow water channels and have a swing-up mechanism that allows easy access for maintenance. A detailed General Arrangement of the system is provided in the figure below.

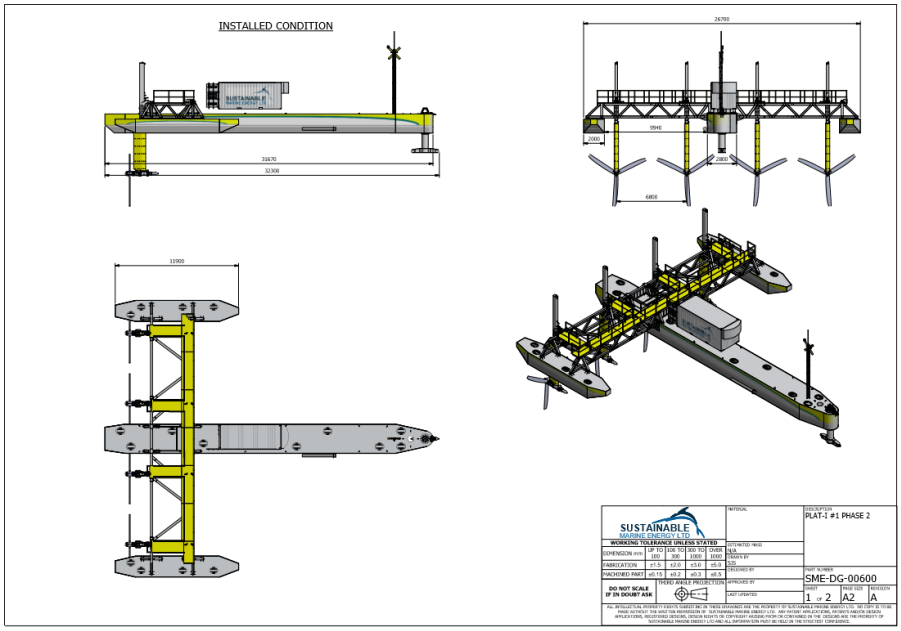

Figure 1: PLAT-I General Arrangement

PLAT-I is intended to be installed the site in Grand Passage shown in the image below. This site has been carefully chosen to position the platform in an area of strong tidal flow while also enabling sufficient space for safe navigation of the channel.

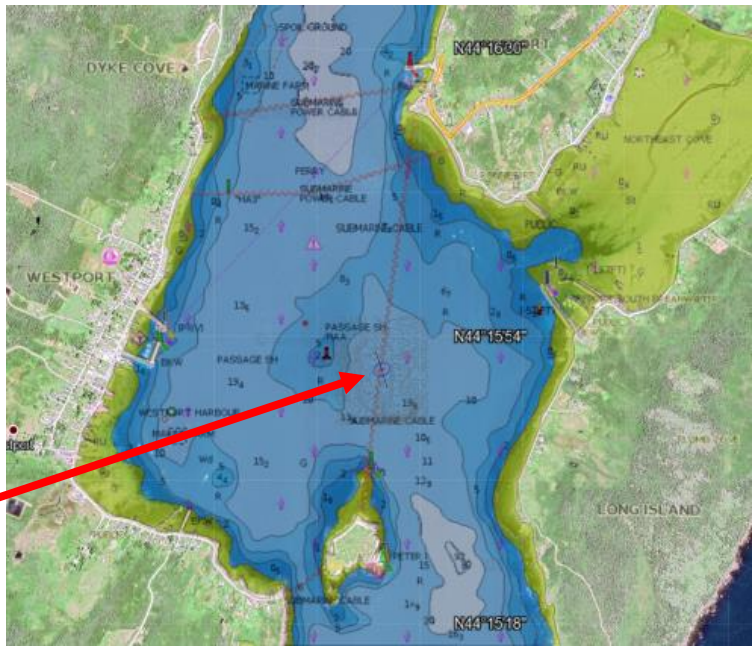

Figure 2: Proposed Platform Location

12.5 Environmental Effects Monitoring Program

PLAT-I's interaction with the environment is one of the critical aspects of the system's performance, making the Environmental Effects Monitoring Program (EEMP) a fundamental part of BRTP's project. The clear water and accessible nature of the site at Grand Passage present ideal conditions to conduct environmental monitoring. The fact that PLAT-I is a floating platform and cameras and sensors can be relatively easily accessed is a great advantage in developing effective environmental monitoring systems. To this end, BRTP will be working with universities, regulators, the wider industry and stakeholders to develop a robust environmental monitoring program to contribute to the understanding of the impacts of tidal energy in Nova Scotian conditions.

The table below briefly lists the key environmental receptors and the monitoring objectives for each. The table also lists the proposed methodologies for detecting and assessing any interactions of marine life with the platform. A detailed EEMP is in the process of being developed for the testing and operation of sensors, systems and methods for collecting this data. The results of this work will be openly provided to regulators, indigenous groups, fishers, and the public.

Receptor	Objectives	Methods
Seabirds	Assess seabird interactions	Visual observation of the device while operating + video cameras on platform
Fish	Detect presence and movement patterns in vicinity of device and any interaction with turbines	Video camera + trialling of active acoustic monitoring (i.e. sonar)
Turtles	Detect presence and movement in vicinity of device	Visual observation, video camera + acoustic monitoring (i.e. sonar)
Marine Mammals	Number of whale species known to be present in G.P. area – including Right Whales. Commitment to establish 'shut down' procedure for whales. Discussions with DFO and other stakeholders ongoing.	Passive acoustic monitoring, video camera & active acoustic monitoring. Visual observation from shore + communication with whale tour companies, Coast Guard and others. Monitoring of local communications / social media.
Acoustics (ambient and machine noise)	Assess noise in vicinity of platform	Passive acoustic monitoring (via use of hydrophones)

12.6 Schedule of Work

BRTP intends to bring PLAT-I to Nova Scotia in Summer 2018 followed closely by anchor installation operations and installation of the platform in Grand Passage. The test program is intended to run for a period of a minimum of three months. Permit applications have been prepared on this basis and have been submitted to Nova Scotia Dept. of Energy, Department of Fisheries and Oceans and Transport Canada.

Installation, testing and removal operations will be planned incorporating feedback from local stakeholders – including lobster fishermen. The staggered, flexible nature of the test program will enable testing operations to be timed for minimal interference with lobster fishing. Engagement with First Nations and other stakeholders has commenced and will continue throughout with a number of meetings and public engagement and 'Open Houses' events to be held in the Grand Passage area. First 'Open House' events were held in the communities of Westport and Freeport on June 19th and 20th 2018.