

MSP Pilot Project

Within the Bilateral Cooperation Agreement between UNEP/MAP and IMELS

Anchoring buoys for small pleasure boats in Albania



Elaborated by:

**National Agency of Protected Areas
Albanian Diving Federation**

2019

CONTRACT n°46_SPA/RAC_2019 - MSP PILOT – IMELS

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Introduction and general framework

The present study is elaborated by NAPA and the Albanian Diving Federation within the framework of the IMAP, the ICZM Protocol and the MSP Decision (Decision on the MSP Conceptual Framework) and are part of the MSP Pilot Project “MSP Pilot project in synergy with SUPREME and GEF Adriatic projects outcomes and to strengthen the EUSAIR Strategy, to be developed into the Adriatic relevant marine areas, subject to major pressures” implemented within the Bilateral Cooperation Contract with the Italian Ministry of Environment, Land and Sea (IMELS). The project is financed by IMELS and is implemented by SPA/RAC under the coordination of the UNEP/MAP Coordinating Unit.

Request for the anchoring buoys study

The scope of this study is to assess and select areas where anchoring buoys need to be installed.

The study includes:

- Description of the areas proposed for anchoring buoys including data on its biodiversity and particularly the marine sea floor and habitat, the vessel frequency in the area and the vessels technical characteristics (type, length, weight, etc.)
- Habitat and substrate Description, coordinates and underwater pictures of the stations proposed for buoys installation
- Justification for buoys installation within the proposed areas
- Financial estimation of buoys installation within the proposed areas
- Technical description of buoys including a sectional drawing of each anchoring buoys indicating the depth and showing all the technical details of all its components (buoy, chain, light panel, etc.) and the respective measures (chain length, buoy diameter, etc).
- List of at least 3 firms which can provide and install buoys.
- The proposed buoys should be in line with the Albanian and regional legal framework related to buoys and marine traffic.
- Organize a meeting to present the results of the study to the stakeholders

Geographic setting of the area covered

This study has been concentrated in the area of Vlora bay, few sites on the outer side of Karaburun peninsula and some other points along the south coast of Albania. Looking to the short period, the study took into consideration the places with interest for diving that can be used also for normal anchoring. The expert will continue to work in cooperation with NAPA to identify places with interest from the services near the coastline (hotels, restaurant, etc.) that can be included in the potential mooring place. In the mean time we already identify as potential sites:

- The area in front of Dhermi beach
- The area in front of Himara beach
- The area in front of Qeparo beach
- The area in front of Borshi beach
- The area in front of Lukova beach

They need more work in the future for assessing necessary elements.

Albania sits between two very large agglomerations of nautical tourism, the one in the South, based in Greece and the one in the North, starting in Montenegro and continuing in Croatia. Currently, vessels from either destination sail right across the Albanian coast without stopping due to the lack of reception facilities, established itineraries and the security afforded by organized facilities. Vessels whose

homeport is in Italy hardly venture into Albanian waters at all. However, interest in Albania is very slowly but surely increasing.

Given the right mix of environmental features and reception facilities, nautical tourism may be the motor of sustainable development in southern Albania. The coastline is not lacking in environmental features. It has been used since time immemorial for relaxation and pleasure. The coastline is replete with small ancient villages dotted on mountainsides.

Albanians’ interest in pleasure navigation is currently limited to speedboats and other small open vessels dedicated to sport fishing. No sailing boats of any type exist but cabin cruisers are starting to interest the wealthy entrepreneurs in Tirana. Tourist vessels converted from old fishing vessels and large cruisers and which can ferry up to 50 people at a time are popular in summer for day outings to various bays around Saranda and Vlora.

Vlora bay has seen a significant increase in land based tourism that naturally over the last three years has started to expand over the sea and undersea attractions. In the bay it is functional a privately funded residential marina. This Marina is a very large marina by Albanian standards (625 berths) and is a typical property development, where real-estate is the economic driving force behind the project. Here, boat owners have the option to purchase an apartment with their berth or vice-versa. Up until now, Orikum Marina solely serves as a parking lot for yachts with no visible downstream benefits flowing into the local economy.

In a quick assessment in collaboration with the main Port Authorities of Durres, Vlora, Shengjin and Saranda in Albania, for 2019 the figure of the vessels sailing in the Albanian marine water is as below.

Table 1. Number of ships registered in Albania in year 2019

Number of ships	Entries registered	Period with the highest touristic frequency	Average overall length	Purpose
370	Different nationalities (Italy, Greece, Germany, Austria, etc)	From June until September	14m – 18m	Touristic purpose
60	Registered entry by the Port Authority of Durres	From April until October	12m -15m	Touristic purpose
138	Private yachts and boats	From July until August	5m – 12m	Touristic purpose
568	Total			

Due to the relatively small number of beaches on the eastern part of the bay, the increased demand for this amenity has been met by an ever-increasing offer of pleasure boats run by private local entrepreneurs that offer day trips over the eastern shore of the Karaburuni peninsula that presently is not developed. Trips are also offered to limited destination on Sazani Island. Most of these trips transport daily tourists toward small beaches and coves. In addition to the above, boats offer trips to some other attractions, most notably marine caves and underwater attractions. All destinations require for vessels involved to be anchored for varying times in these destinations.

As for big touristic cruises, there are two sailing in the Albanian waters in Saranda, from June until the

end of August, every Tuesday and Friday. Also, there is one big touristic cruise in Durres every Thursday, from July to August.

Proposed location of anchoring buoys

The project has identified 19 sites (Saranda has 2 sites) for a total of 34 buoys. Based on the number and type of anchoring vessels the proposed anchoring type for these sites is that of trot/swing mooring. When one boy is involved the arrangement is called a swing mooring and the vessel will move with the wind or current.

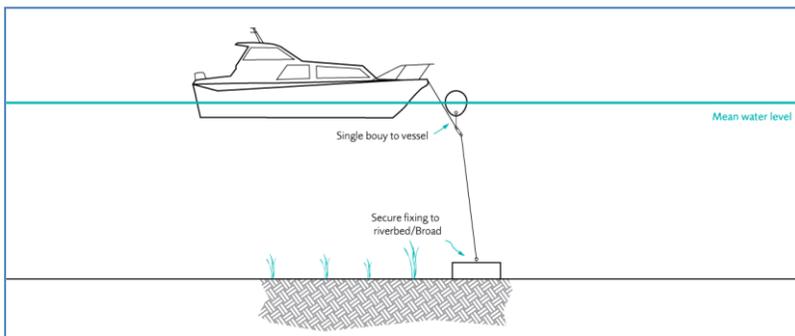


Figure 1 Swing mooring

A row of linked buoys is a trot mooring and enables vessels to be secured so they do not drift with the wind or current. The structure requires a means to get ashore, such as a dinghy. Maintenance is generally low, but regular inspections of the chain and replacements will be required. Ideal for broads in areas where there are not strong currents. Relatively easy to install and low cost. Traditional mooring anchors or gravity anchors act as a weight on the seabed. To reduce the footprint on the seabed, an Environmentally Friendly Moorings (EFM) replacement for such an anchor is to use an embedment anchor such as a helical (Figure 2) that penetrates the seabed, with little surface area on the seafloor.

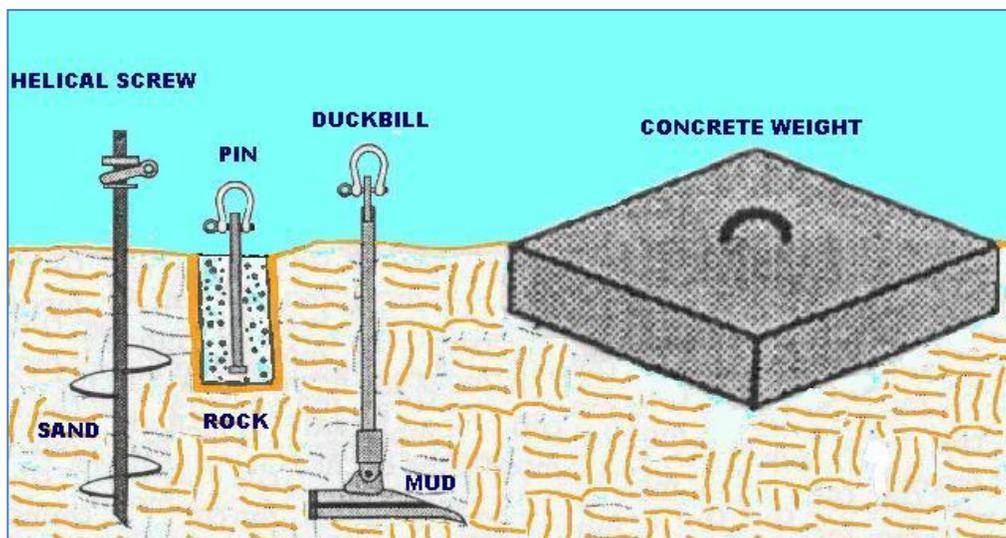


Figure 2. Large concrete blocks that smother large areas of seabed are no longer recommended for locations where Posidonia meadows occur. Depending on the nature of the seabed, helical screws, grouted pins or duckbills are now mandatory in no-anchoring zone

Table 2 *List of locations of mooring buoys*

Nr	Location	Coordinates	Type	Depth (m)	Bottom type	Number	Posidonia	Recommended maximum allowed vessels gross tonnage or overall length per buoy
1.	PO – hospital ship wreck	N40 22 53.8 E19 27 52.9	Swing mooring	35	Mud	1	NO	Maximum 13 ton, approx. 14 m
2.	“Prosafo” wreck	N40 20 46.5 E19 28 21.9	Swing mooring	20	Mud	1	NO	Maximum 13 ton, approx. 14 m
3.	“Luciano” wreck	N40 19 40.5 E19 25 29.2	Swing mooring	20	Mud	1	NO	Maximum 13 ton, approx. 14 m
4.	“Amfora” site	N40 21 27.6 E19 24 43.1	Swing mooring	30	Mud	1	NO	Maximum 13 ton, approx. 14 m
5.	“Andromeda” ship wreck	N40 22 50.8 E19 24 56.7	Swing mooring	45	Mud	1	NO	Maximum 13 ton, approx. 14 m
6.	Shen-Vasil bay	N40 24 06.9 E19 22 56.9	Trot mooring	10	Sand	2	YES	Maximum 13 ton, approx. 14 m
7.	Shen-Jani bay	N40 25 54.9 E19 19 57.7	Trot mooring	10	Sand	2	YES	Maximum 13 ton, approx. 14 m
8.	Haxhi Ali cave	N40 25 52.1 E19 18 19.1	Swing mooring	15	Rock	2	YES	Maximum 13 ton, approx. 14 m
9.	Dafina bay	N40 21 01.9 E19 21 44.9	Swing mooring	10	Sand	1	YES	Maximum 13 ton, approx. 14 m
10.	Bristani bay	N40 18 59.8 E19 22 32.5	Trot mooring	10	Sand	1	YES	Maximum 13 ton, approx. 14 m
11.	Grama bay	N40 12 57.9 E19 28 24.3	Swing mooring	20	Sand	1	YES	Maximum 13 ton, approx. 14 m
12.	St Andrea - Valanidh bay	N40 11 51.1 E19 30 23.3	Swing mooring	20	Sand	1	YES	Maximum 13 ton, approx. 14 m
13.	Plazhi Admiralit	N40 29 54.3 E19 17 25.5	Swing mooring	10	Sand	3	YES	Maximum 13 ton, approx. 14 m
14.	Plazhi tuneleve	N40 30 24.2 E19 16 36.4	Swing mooring	10	Sand	3	YES	Maximum 13 ton, approx. 14 m
15.	Jala	N 40° 7.665’ E 19° 39.286’	Swing mooring	28	Gravel	2	YES	Maximum 13 ton, approx. 14 m
16.	Porto Palermo bay	N 40° 3.874’ E 19° 47.519’	Swing mooring	20	Sand	4	YES	Maximum 13 ton, approx. 14 m
17.	Saranda bay	N 39° 52.236’ E 20° 0.698’	Swing mooring	15	Sand	2	No	Maximum 13 ton, approx. 14 m
18.		N 39° 51.995’ E 0° 0.816’	Swing mooring	15	Mud	1	No	Maximum 13 ton, approx. 14 m
19.	Ksamili bay	N 39° 46.682’ E 19° 59.861’	Swing mooring	10	Mud	4	NO	Maximum 13 ton, approx. 14 m
Total						34		

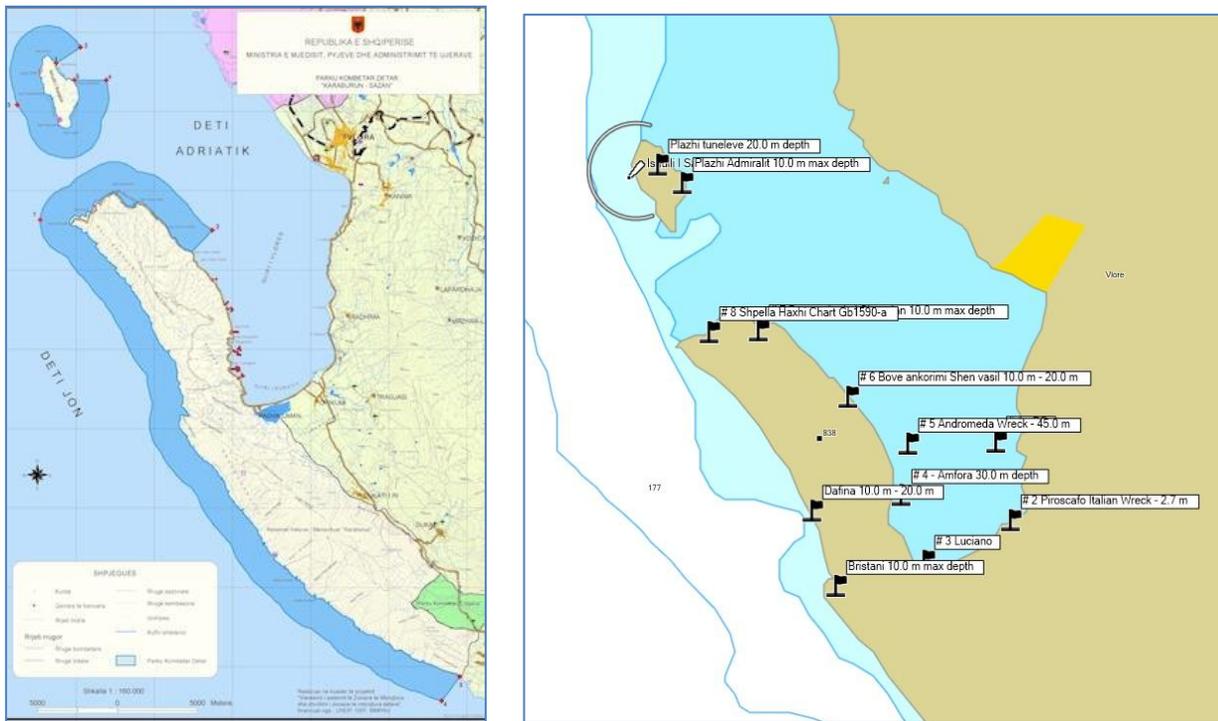


Figure 3 Map of the Karaburun-Sazan MPA and locations of the anchoring sites

Site 1 – Po hospital ship

In the Bay of Vlora (Valona), Albania, resting at a depth of 35 m, lies one of the largest and most impressive wrecks in the whole Adriatic, that of the Italian hospital ship *Po*, sunk by British torpedo bombers on 14 March 1941. In the darkness of the night, the pilots were not aware that the ship was a hospital ship. In the attack that ensued, 21 on board the ship died, including three nurses; one of whom was Mussolini’s daughter, Edda Ciano, who was working for the Red Cross. Today the location is one of the most attractive diving sites in the Vlora bay. The site is relatively sheltered. Bottom structure is MUD. Bottom anchor: concrete weight



Figure 4 Underwater photos of Po shipwreck as they are today

Site 2: Italian Piroscaf

Piroscafo ship is a transportation ship for the military and their equipment, weaponry and vehicles. It sank in 1940. Bottom structure is MUD. Bottom anchor: concrete weight

Site 3: Luciano wreck

Luciano is a ship belonging to the Venice Maritime Compartment. It was first purchased by the British and then Venice took control of it, using it as a military means of transportation. It was attacked by the British and sank in 1941 carrying 2000 tons of ammunition. Bottom structure is MUD.

Bottom anchor: concrete weight

Site 4: Amphora site

There are more than 30 amphora of Vth century deposit on the sea bottom near to a sink trade boat of this time. The amphora are damaged but still can be an attraction for diving.

Bottom structure is MUD. Bottom anchor: concrete weight

Site 5: Andromeda wreck

Italian torpedo boat Andromeda, a Spica-class torpedo boat launched in 1936 and sunk in 1941. Bottom structure is MUD. Bottom anchor: concrete weight

Site 6: Shen Vasil bay

Shen Vasil bay is one of the picturesque sheltered bays in the eastern flank of Karaburuni peninsula. The bay is located with the borders of the KNP. The area has only seasonal touristic structures tendering for day tourism. It does not have any permanent and overnight stay facilities. The recommended anchoring in this site is trot mooring or 3 swing moorings. The bottom structure is gravel. *Posidonia* clusters are present mixed with *Cydomocea nodosa* closer to the shore.

Bottom anchor: helical screw



Figure 5 Shen Vasili bay and typical habitat of *Cydomocea nodosa*

Site 7: Shen Jani bay

Shen Jani is another bay north of the previous. Similarly the gravel beach is used for day tourists. The bay is located with the borders of the KNP. The area has only seasonal touristic structures tendering for day tourism. It does not have any permanent and overnight stay facilities. The recommended anchoring in this site are 2 - 3 swing moorings. The bottom structure is gravel with *Posidonia* clusters mostly nearby boulders.

Bottom anchor: helical screw



Figure 6 Shen Jani bay with sparse habitat of *Posidonia oceanica*

Site 8: Haxhi Ali marine cave

The cave was named after Haxhi Aliu, a prominent Albanian warrior and sailor from Ulcinj who fled with his son in this cave. Several archaeological objects have been found, that prove that this cave was used by traders and passers during the ancient times. The cave has a length of 30 m with a width which can vary between of 10–12 m and a height of 18 m. It is regarded as one of the country's most beautiful caves and attracts numerous visitors. Notably it has been recognized as a natural monument of national importance by the Ministry of Environment and is part of the Karaburun-Sazan Marine Park. Entry to the cave is restricted to small boats and most likely it will be restricted further in the future. All vessels will have to anchor near the entrance. The bathymetry near the cave has a ledge at 16 meters and quickly falls to 25 – 30 meters. The bottom is mostly rocky covered with photophilic algae near the surface. Due to its popularity, this location needs at least three swing moorings that will have to be placed at a certain distance to allow for the vessels to park safely.



Figure 7 Haxhi Ali cave entrance

Site 9: Dafina bay

Dafina Bay is one of the partially sheltered bays in the outer side of Karaburun peninsula. The bay has a small gravel beach and shallow half immersed marine cave. The bay is located in the core zone of KNP. The bottom of the bay is mostly covered in healthy patches of Posidonia. One swing mooring is recommended. Bottom anchor: Helical pin



Figure 8 Dafina bay

Site 10: Bristani bay

Bristani bay offers partial shelter from the southern and northern winds. The bay has typically a small gravel beach while the flanks are covered in green Mediterranean makia vegetation. The bay is relatively shallow with well-developed Posidonia coverage growing over thick matte. In the middle of the bay there is a partially exposed wooden skeleton of a medieval ship. Bottom anchor: Helical pin



Figure 9 Bristani bay and Posidonia growing on matte

Site 11: Grama bay

The name of the bay is closely associated with the engraved inscriptions in the surrounding coastal cliffs; Grama for the Greek word for 'letter'. It is also referred to as Gram(m)ata, the plural form of 'Gram(m)a' from the inscriptions of thanksgiving left by Greek, Roman and medieval sailors. In antiquity the bay of Grama was the only safe cove along the coast west of the Ceraunian Mountains. The bay is home to precious archaeological, historical and cultural values, as it served as an important harbour and shelter for those sailing along the coast during classical antiquity. The bay can be accessed more easily from the tourist center of Dhermi – Palas in the south. The bottom of the bay has Posidonia growing on the west-facing slope near the beach scree slope that gets denser toward the entry of the bay. Two swing mooring are recommended. Bottom anchor: Helical pin



Figure 10 Grama bay

Site 12: Shen Andrea bay

Shen Andrea bay is the southernmost of the small bays to be found in the Karaburuni National Park. The bay is very picturesque with a small gravel beach nestled in lush oak forests. The area is relatively easy accessed by sea from the Dhermi - Palasa tourist center. Posidonia is present in irregular patches in the center of the bay getting established better in deeper waters that offer some protection from the erosive action of the waves.



Site 13-14 Sazani Island – Admiral beach

The beach is visited daily form small to medium size boats transporting people for daily beach frequentation. The site needs 2-3 swing moorings.

Site 15 Jala

Jala is one of the most frequented sites in the Albanian coast. Home of an interesting reef, starting approximately at 16 meters and levelling off at 38 m deep underwater, it is a vastly visited by sailboats and small private boats, attracted by the natural beauty of the site. This site needs two anchoring buoys.



Site 16 Porto Palermo

Porto Palermo is the safest natural harbour in the study area. In the centre of the bay there is a small peninsula with a well preserved medieval castle. The site is very attractive for small private boats and sailboats usually visiting for touristic purposes. In order to protect the underwater fauna, this site needs at least four anchoring buoys.



Site 17 Saranda Bay

Apart from incredibly beautiful waters and attractive sites, Saranda Bay is home of some wrecks. The most notable one is the WWII ship “**Probitas**” an Italian military ship, used for transportation. It sank in 16 September 1943. This site needs two anchoring buoys for boats visiting the site. There is also an Albanian ship in the deep waters of Saranda Bay. Sunk in 1942, **Tomorri ship** is made of wood and it was used for the transportation of food merchandise following the route from Corfu to Saranda. The site around the Tomorri Ship needs one anchoring buoy.



The underwater silhouette of Probitas shipwreck in the Saranda bay

Site 18 Ksamil Bay

One of the most attractive and populated sites in the Albanian coastline, it is now an underwater park. There are six recent Albanian navy ships in the waters in Ksamil Bay. They were manufactured and produced in Russia during the Cold War and then the Albanian Navy used them. During 1997 crisis, these ships were severely damaged, therefore the Navy decided to sink them, creating thus the underwater park. In order to properly define the area around the ships and for the visiting boats to anchor easily, the site needs four anchoring buoys.



Potential company

During the previous experiences in the country through the UNDP project, three companies' shows interest in the process of installing buoys in Albania. Below there are three contacts of the entities, but only one is from the country:

Zeqiri shpk – Albania

Street Pavarsia , Iliria , Durres , Albania

M:+355 69 20 64 583 /+355 69 77 79 770

zeqiri_shpk@hotmail.com

DENAR DENIZ – Turkey

Phone: 0 212 216 64 82

Fax: 0 212 216 64 83

E-Mail: info@den-ar.com

<http://www.den-ar.com/>

UNIT EXPORT – UK

www.unitexport.com

Legal implication

There is any national law or bylaw to consider related to buoys installation.

According to the new Law on PAs in Albania, park administration has the authority to take appropriate measures to ensure conservation and better management of the protected area, investing on park infrastructure to facilitate the access and avoid underwater habitats damages.

In this regards no prior permission from Naval Forces is required for the anchoring buoys inside the protected areas, but also outside, as there are considered as management facilities. For the buoys outside the MPAs, there will be a coordination work with the Albanian Hydrographic Services for the position of the buoys. At the end of the installation, NAPA will send a notification letter to Albanian Hydrographic Services including all installation details of anchoring buoys present.

Installation of signal buoys inside the marine protected areas or/and outside its borders requires, the prior written permission from Albanian Naval Forces and Albanian Hydrographic Service. The request for permission to follow on the investment should be sent to the Albanian Naval Forces, attaching all details about the exact coordinates of the buoys installation, type of buoys and their characteristics, lighting system to be applied and other information if available. All the installation process should be followed and respect international navigation standard and laws. Naval Forces are forwarding the request to Albanian Hydrographic Service to ensure that the investment is respecting all the requirements and obligations of national laws and sea regulations and international standard. After the permission and at the end of the installation the park administration must send a detailed report including coordinates of the buoys to Albanian Hydrographic Service.

Cost of the work

Based on the previous experience in Albania the cost was calculated on an average value. For sure based on the distance of the sites for the Vlora bay, the cost will be higher for the transport and boat movement.

The calculation takes into account the price of the equipment, the concrete and chain part, all the cost related to the transportation, diving, maintenance, etc.

Table 3. Description of costs for equipment and installations

	DESCRIPTION	Unit	Quantity	Rate	AMOUNT IN US\$ (without VAT)
1	Geotechnical investigation, 1 borehole or multiple probing, for the determination of suitable type of mooring (helical, pin or duckbill for sand, rock and mud respectively).	Sum	--	--	10,000
2	Supply and install swing mooring straps as detailed, including bottom mooring, bottom chain, mooring strap, pick-up buoy and swivels, complete.	Each	34	1,900	64,600
3	Insurance	Per year	34	100	3,400
4	Maintenance	Per year	34	100	3,400
				TOTAL	US\$ 81,400

Annex 1

GENERAL SPECIFICATIONS FOR LIGHT MOORING BUOYS

TECHNICAL REQUIREMENTS- LIGHT BUOYS

General

The buoys have to be compatible for protected areas as well as for open conditions moderately exposed to high seas. They should offer stability and resistance with comparatively reduced dimensions, and can be anchored in open sea for applications requiring a focal plane of up to 3 meter from the sea-level. The buoys will be for depths of between 10 and 20 meters (with the option to extend the depth up to 50 meters with the suitable mooring). They should be UV rays and chemical polluting agent resistant with a greatly reduced maintenance requirement.

Manufacturing Materials

The light buoys will be formed by a floating body composed of 4 polyethylene rotomoulded shells floats filled with rigid polyurethane foam, to guarantee unsinkability in case of damages, impacts or collision. They, almost in plastic materials, permit a very limited maintenance. The central structure must be polyethylene tube that connects every part of the buoy: floats, counterbalance and the superior part.

The length of the central structure can be varied, so the focal plane and the stability can change slightly. The color of the buoy should not be obtained by painting but it should be embedded in the plastic, so that no painting is necessary for almost the whole buoy life.

Electrical Equipment

The buoys will have a CSP (Compact Solar Power) system and will be equipped with LED powered by incorporated photoelectric cells of a nominal 3 to 6 nautical mile range. The lantern focal plane on the line of floatation usually varies between 2 to 4 meters. Utilization of solar panels and LEDs will ensure extended operating electrical system. Visibility during day time will be ensured through a metal day-mark of large dimensions positioned on top of the tower, with provisions by special construction arrangements for passive radaring. For further distances (between 7 and 10 nautical miles) the LED lantern powered by solar panels will be used with an autonomous electric storage battery.

The main technical characteristic

- Tubes in PE as reinforcing rings for cages and for handrails.
- PE brackets formed from tubing and sheets or molded for tubes from OD 225 to OD 355 mm.
- Volume 700 liter
- Dimension: diameter 120x80 cm
- The buoy shell must be rotomolded high impact resistant polyethylene.
- Color imbedded.

Prepare & Attach Chain

- Fit and secure 1 x Ø16-22mm Shackle and 1 x Ø16-22mm Swivel Eye to the base of the bridle.
- Note: All Shackles must be positively locked. For example, use 3mm Stainless Steel wire to

lock the pin eye, or use a use a shackle pin with nut and split pin.

- Fit and secure a length of chain to the Swivel Eye using 1 x Ø16-22mm Shackle.
- Note: Please use the guides below to determine the correct chain size and length.

Lifting

The buoys structure must allow for easy lifting and temporary mooring of the maintenance boat. Easy-handling provisions have to be made by two lifting eyes on top of the floats. Another two eyes will be fixed onto the lower section of the floats for attachment to the mooring sling.

Additional fittings

The buoys must be fitted with electronic GPS tracking systems so as to keep an eye on position and correct functioning of power supply and signaling performance.

Technical Data

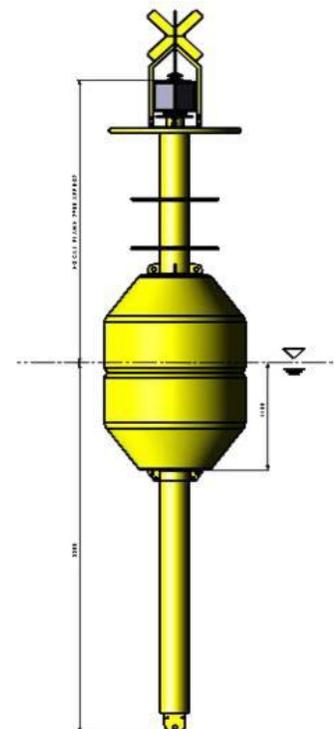
Anchoring buoys are very simple in their format structure. Based on this element existing in other types of buoys can be applied.



The described different options below are all related to different types of buoys that fulfill the criteria for being as signaling buoys. They can be combine with the anchoring ones depending on the offering.

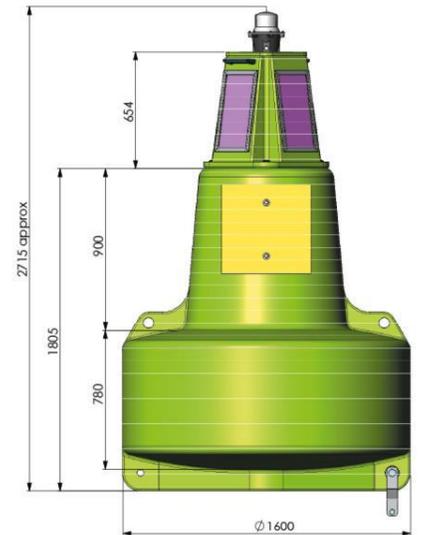
Option 1

Option 1 DIMENSIONS	
Body Diameter (nominal)	1300 mm
Thickness minimum	9.5 mm
Focal plane	3300 m
Draught (without mooring)	3444 mm
Displacement per dm/immersion	132 kg
Air weight	910 kg
STANDARD EQUIPMENT	
Marine Lantern	20 kg max supported weight
Structure + Radar Reflector	GALVANIZED STEEL
Float	SHELL: Rotomoulded polyethylene CORE: Polyurethane foam
Mooring Eye	GALVANIZED STEEL
RECOMMENDED MOORING	
Open link chain size	20 mm
Max supported mooring	482 kg
Sinker (in sea water)	20 00 kg



Option 2 DIMENSIONS

Buoy Body Diameter (nominal)	1600 mm
Thickness minimum	8 mm
Focal plane height standard	2100 mm
Draught (Without mooring)	500 mm
Displacement per dm/immersion	200 Kg
Total length	2700 mm
Total weight approx.	440 Kg
Lateral surface	1.6 m ²
MATERIALS	
Buoy Body:	POLYETHYLENE
Filling	POLYURETHANE FOAM
MARINE LANTERN	
20 kg max supported weight	
RECOMMENDED MOORING	
Open link chain size	16 mm
Max supported mooring:	200 Kg
Sinker approx. (in sea water):	800 Kg



Option 3 DIMENSIONS

Buoy body diameter (nominal)	2200 mm
Thickness minimum	8 mm
Focal plane	3720 m
Displacement dm/immersion	280 kg
Free board (without mooring)	1000 mm
Total length	6400 mm
Total weight approx.	1800 kg
MATERIALS	
Buoy Body	PE rotomulded + expanded PU
Tube	PE
STANDARD ELECTRICAL EQUIPMENT	
Marine Lantern: LED 120-256	
Light range: 5 nautical miles	
Main supply: CSP 400 series	
RECOMMENDED MOORING	
Open link chain	28 mm
Max supported mooring:	1400



Annex 2

Installation / Mooring

Details

The mooring system for buoys should consider the depth and type of sea bed as well as the different marine meteorological conditions it has to face.

Pendant Mooring with a hook on one hawse on the bottom of the tail or on the ballast skirt is preferably used in shallow water, water inside the harbor or unexposed to rough sea conditions.

Bobstay Mooring has been purposely projected for deep water in open sea. Attaching is done to the body of a tail buoy fitted with two lateral hawses for the hooking of the chain which, being very close to the line of floatation, reduces the oscillation of the buoy due to the undulating movement and gives more stability against the sea currents.

Instructions

Check Components

Unpack all Mooring and check all components are complete and correct.

Prepare & Attach Chain

Fit and secure 1 x Ø16mm Shackle and 1 x Ø16mm Swivel Eye to the base of the bridle.

Note: All Shackles must be positively locked. For example use 3mm Stainless Steel wire to lock the pin eye, or use a use a shackle pin with nut and split pin.

Fit and secure a length of chain to the Swivel Eye using 1 x Ø16mm Shackle.

Note: Please use the guides below to determine the correct chain size and length.

Attach Mooring Block

Fit and secure the Chain to the Mooring Block.

The Buoy is now ready for deployment.

Chain Length Guide

	Recommended Length of Chain	Maximum Water Depth
Best Practice	3 x Water Depth	17.5m
For Reduced Water Circle (use only where current <2kts)	Not less than 2 x Water Depth	25m

Note: Recommendations given herein are advisory only. As each buoy installation varies, the buoy operator should establish fitness for purpose prior to installation.

Annex 3

Maintenance

Provisions

The Buoys are designed to require very little maintenance. It is recommended the buoy be inspected annually. Inspection may need to increase depending on the local conditions and the position of the buoy.

Marine Buoy – Annual Maintenance

- Visually inspect buoy for damage.
- Inspect the top mark for any damage. Repair any broken or damaged section.
- Clean buoy of animal debris.

Mooring – Annual Maintenance

- Check and clear the tail and ride chains from shells and algae.
- Check for wear on any shackle axis and check the tapered pins. Any worn shackles must be replaced.
- Check the free movement of each swivel around its head. If any swivel head sticks it must be replaced.
- Check every link of the thrash length of the chain. Check the diameter of the nips and sides and also inspect the welds on every link.
- If depth allows, a worn riding chain may be reversed.
- Change a chain when any link shows excessive wear.
- Chain must be replaced if any link wears to less than 3/5 of the original diameter.

Mooring – Biannual Maintenance

Inspect the ground chain and sinker.