

## A: Formalities

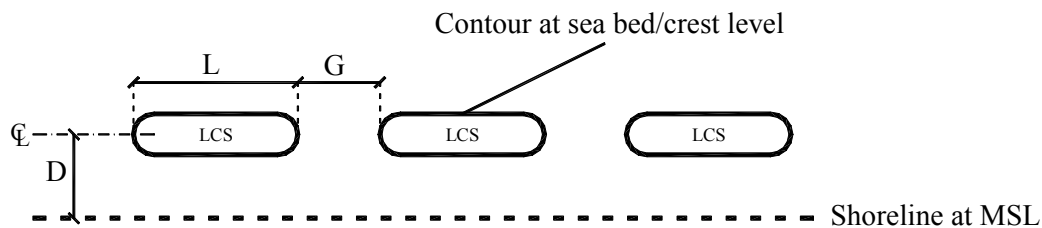
Participant code and who to contact.	AUTH GR J. Avgeris
E-mail	<a href="mailto:iavgeris@civil.auth.gr">iavgeris@civil.auth.gr</a>
This date (today, mm:dd:yyyy) and revision number (A..Z).	17/09/01 Rev A
Location of LCS.	<b>St. George hotel, Cyprus</b> 5 km North from Paphos
Start date, length and/or end of works. Have there been any later changes? If so, when?	Start in 1997. Construction period, 4 months approx. No further change.
Design life - the minimum length of time the beach management scheme is designed to last.	50 years
Which tools and regulations are used for the design formulae (mathematical models, model tests, engineering experience, standards, recommendations).	Mathematical models, engineering experience and international literature recommendations.
Who fund the work (e.g. Public Administration or private company)?	Private company
Costs.	

## B: Geometry and construction materials

### B1 System layout (aerial view)

Are shore attaching structures present (e.g. groins)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are emerging head islands present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The following sketch concerns only shore parallel LCS; if the layout is different you must insert another sketch and specify parameters like the ones suggested. If a picture is available please insert it too.



The typical layout is given at Sea Bed (index SB) and at Crest Level (index CL).

Parameter	Description	Fill in box	unit
D	Distance from shoreline	70	meters
$L_{SB}$	Length of LCS at sea bed	130	meters
$L_{CL}$	Length of LCS at crest level	115	meters
$G_{SB}$	Gap between LCS at sea bed	-	meters
$G_{CL}$	Gap between LCS at crest level	-	meters
n	Number of LCS in system	1	

Remarks:

### B2 Bathymetry of sea bed and beach

Please insert a dimensioned sketch if possible.

#### Description of bathymetry when LCS were build

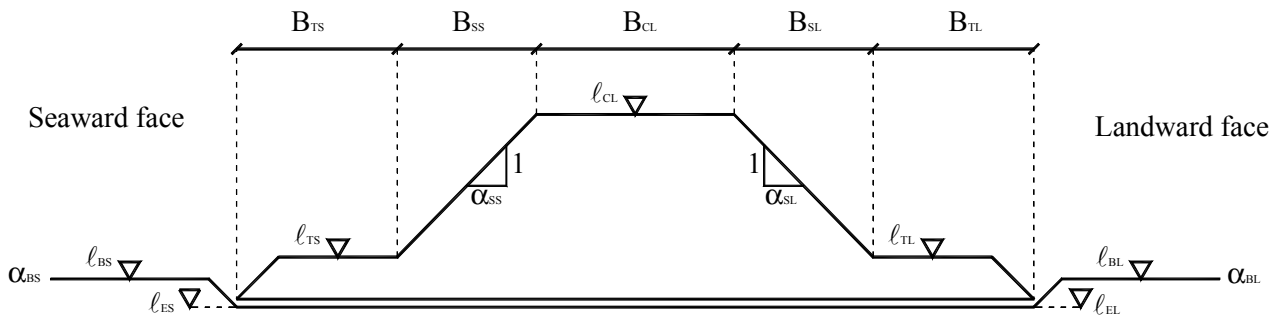
Is detailed information (measurements) available? If so, please explain.

**7.5 % slope, uniform. Detailed sea bed soundings were available.**

### B3 Trunk cross section/contour geometry – outer profile

If shore attached structures perpendicular to shoreline are present, please insert a sketch with typical longitudinal section and typical selected cross sections. Specify parameters as the ones given below.

If the layout does not fit the following sketch please insert another sketch.

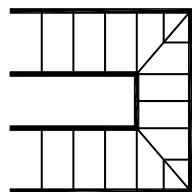


Parameter	Description	Fill in box	unit
$\alpha_{BS}$	Steepness of sea bed, seaward	7,5	%
$\alpha_{BL}$	Steepness of sea bed, landward	7,5	%
$\alpha_{SS}$	Steepness of slope, seaward	2.5:1	
$\alpha_{SL}$	Steepness of slope, landward	2.5:1	
$l_{BS}$	Level of sea bed at seaward toe	- 4,8	meters
$l_{ES}$	Level of excavation, seaward	-	meters
$l_{TS}$	Level of toe, seaward	-	meters
$l_{CL}$	Level of crest	- 0,3	meters
$l_{BS}$	Level of sea bed at landward toe	- 3,2	meters
$l_{ES}$	Level of excavation, landward	-	meters
$l_{TS}$	Level of toe, landward	-	meters
$B_{TS}$	Width of toe, seaward	-	meters
$B_{SS}$	Width of slope, seaward	14	meters
$B_{CL}$	Width of crest	5	meters
$B_{SL}$	Width of slope, landward	10	meters
$B_{TL}$	Width of toe, landward	-	meters

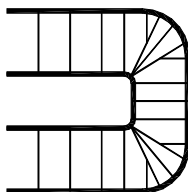
**Remarks** (e.g. different layout along shoreline, other important parameters).

### B4 Round head contour geometry

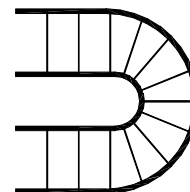
Rectangular



Intermediate



Circular

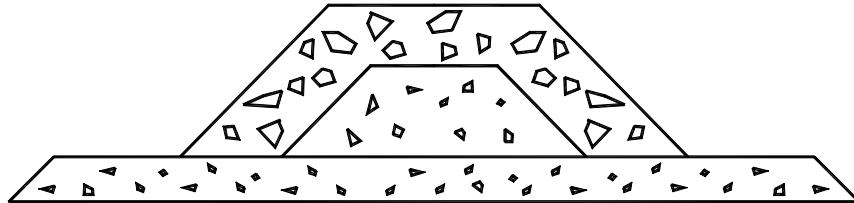


What is the shape of the round head?

- Rectangular  
 Intermediate  
 Circular

## B5 Description of layers

Please insert a dimensioned sketch with the typical cross-section composition.



For each layer, please provide the following information.

ARMOUR LAYER CHARACTERISTICS ( 2 x D <sub>50</sub> )			
Parameter	Description	Fill in box	unit
	Material (e.g. quartzite, concrete)	Quarry rock	
	Shape of blocks (e.g. quarry rock, sea stones, cubes)	Quarry rock	
$\rho_r$	Mass density of material	2650	kg/m <sup>3</sup>
D <sub>n50</sub>	Nominal diameter	1,4	meters
Gr	Grading of the material (D <sub>85</sub> /D <sub>15</sub> )	6 – 8 Tons	
	Geotextile between layers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

**Remarks** (e.g. details on geotextile)

Core structure formed by quarry rock 400 – 1000 kg (Weight of armoring/10)

For more details see attached drawings

## B6 Construction method

How have the stones been placed?

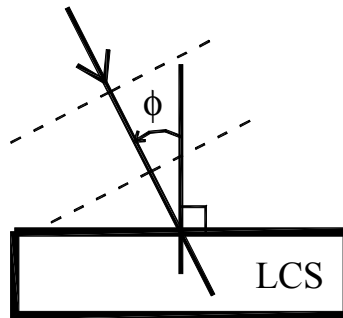
- Dumped with barges  
 Placed with barges  
 Land based operation  
 Other:

Sequence of operation.

- Construction started upstream  
 Construction started downstream

## C: Local meteomarine conditions at the structure

### C1 Waves



Parameter	Description	Fill in box	unit
$H_s$	Design significant wave height	6,2	meters
$T_p$	Design peak period	11,2	seconds
$\phi$	Design wave incidence angle		degree

**Remarks** (provide information on wave statistics and wave spectra if available, e.g.  $H_s$  corresponding to return periods 1 month, 1 y, 10 y, 50 y. Please specify the source of the data) **Return period = 1 year Source: From wave statistics**

### C2 Water levels

TIDAL WATER LEVEL VARIATIONS			
Parameter	Description	Fill in box	unit
HAT	Highest astronomical tide level		meters
MHWL	Mean tide high water level		meters
MWL	Mean water level		meters
MLWL	Mean tide low water level		meters
LAT	Lowest astronomical tide level		meters

**Water level statistics** (If available, please provide information on design water level and tide and surge generated water levels corresponding to return periods 1 month, 1 y, 10 y, 50 y)

### C3 Current

#### Tidal currents

Description & statistics if available

#### Surge generated currents

Description & statistics if available (e.g. mean velocities as function of water depth/distance to shore line)

## D: Sea bed and beach characteristics, incl. sediment transport

Description of the coast (e.g. bar type coast with gentle slope or plane coast with steep slope)

### D1 Natural sea bed material at surface

Parameter	Description of sea bed material	Fill in box	unit
	Material (e.g. quartzite)		
$\rho_r$	Mass density of material		kg/m <sup>3</sup>
$D_{n50}$	Nominal diameter grain size		meters
Gr	Grading of the material ( $D_{85}/D_{15}$ )		

Remarks (provide grain distribution if available)

### D2 Natural beach material at surface

Parameter	Description of beach material	Fill in box	unit
	Material (e.g. quartzite)		
$\rho_r$	Mass density of material		kg/m <sup>3</sup>
$D_{n50}$	Nominal diameter grain size		meters
Gr	Grading of the material ( $D_{85}/D_{15}$ )		

Natural supply?

Yes  No

Supplied by beach nourishment?

Yes  No

Remarks (provide grain distribution if available)

### D3 Artificial beach nourishment

Description of nourishment

Parameter	Description of artificial nourishment	Fill in box	unit
	Material (e.g. quartzite)		
$\rho_r$	Mass density of material		kg/m <sup>3</sup>
$D_{n50}$	Nominal diameter		meters
Gr	Grading of the material ( $D_{85}/D_{15}$ )		

Remarks (provide grain distribution if available)

--

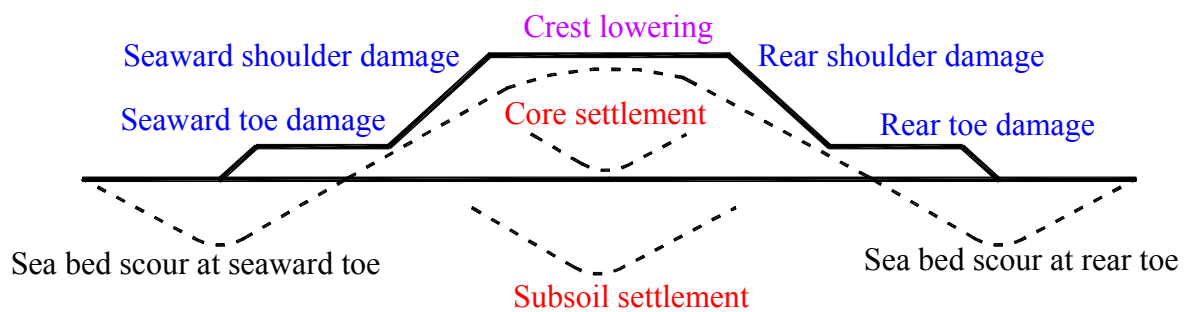
## D4 Sediment transport

<b>Description of the sediment transport</b> (e.g. direction and amount of transport, distribution over the coastal profile)
--

Parameter	Description of sediment	Fill in box	unit
	Material (e.g. quartzite)		
$\rho_r$	Mass density of material		kg/m <sup>3</sup>
$D_{n50}$	Nominal diameter		meters
Gr	Grading of the material ( $D_{85}/D_{15}$ )		

## E: Structural performance

### E1 Definition of failure modes



Please insert a sketch with dimensions of LCS cross-section when it was build compared to the appearance now (like the figure of failure modes) if possible.

In the following please specify damages by failure mode (see figure of failure mode definition) and amount of damage. If you know the reason for the problems/failures (e.g. extreme wave climate/water level), please type it in the description boxes.

### E2 Materials

Problems caused by deterioration?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Problems caused by breakage?	<input type="checkbox"/> Yes <input type="checkbox"/> No

<b>Description of the condition of the materials</b>
--

### E3 Settlement of the structure

<b>Description of settlements of core/subsoil</b> (e.g. instabilities in foundation, internal
---

erosion). Please specify settlement in meters.

### E4 Local erosion of sea bed/scour

Description of erosion/scour by roundheads (please specify scour depth)

Description of erosion/scour by trunk (please specify scour depth)

### E5 Erosion and instability of slopes, shoulders, crest and toes

**Stage of damage**

- No or marginal damage
- Moderate to severe damage
- Failure

Description of displacements of structural material (provide sketch if possible)

### E6 Damage parameters

The definition of a displaced unit is, when a unit is displaced by more than  $D_{n50}$ .  
Try to give an estimate of the following damage parameters relevant to armour.

Parameter	Description	Fill in box	unit
The relative number of displaced units	$D(\%) = \frac{n_d (\text{number of displaced units})}{\text{Total number of units}} \cdot 100$		%
The strip displacement	$N_{od} = \frac{n_d}{L/D_{n50}}$ , L is the length of LCS		

## F: Socio-economic aspects

What regime of property has the coast at this site?

Private , Public full free access , Public limited access , Natural reserve , Don't know ,  
Other (please specify):

Who decided that an LCS should be built at that site?

- Individual, acting for private purpose
- Individual, acting for public purpose (e.g. Natural park administrator)
- Local authority (e.g. city council)
- Regional authority (e.g. province level)
- National authority (e.g. ministry)
- Don't know

Please give name of the authority whenever applicable:



What was the main motive for building the LCS?

- Coast erosion   
 Inducing or maintaining recreational activity , please specify: swimming and sea sports  
 Environmental concern , please specify:  
 Other , please specify:  
 Don't know

Was that LCS part of a larger coastal management plan?

- Yes , please specify:  
 No , please specify:  
 Don't know

Public opinion on that LCS:

- Construction was accompanied by public protest   
 The public did not react   
 Public opinion asked for the LCS   
 Local commerce asked for the LCS   
 Don't know   
 Other (please specify):

Description of the coast:

- Urban , Densely constructed , Scarcely constructed , No apparent construction   
 Are there dunes? Yes , No   
 Has commercial activity changed significantly after construction of the LCS?  
     hotels construction: More hotels , Less hotels , Unaffected , Don't know   
     bars and similar construction: More , Less , Unaffected , Don't know   
     advertising for the area: More , Less , Unaffected , Don't know   
 other (specify):

Visual impact of LCS not already described in Part B: Are there parts of the LCS visible under average conditions? Poles , Cables , Reefs ,  
 Others (please specify):

Water quality changes since LCS construction

- Are there episodes of water turbidity since construction?  
     No , Rare , Often , Permanent   
 Were there episodes of water turbidity before construction?  
     No , Rare , Often , Permanent   
 Has water quality otherwise been affected (for example, more or less detritus accumulating)?  
 Please describe:

How would you qualify the following recreational activities at or around the LCS? (DK = Don't know)

- |                        |   |                                   |                                 |  |  |
|------------------------|---|-----------------------------------|---------------------------------|--|--|
| Fishing (recreational) | Intense <input type="checkbox"/>            | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input type="checkbox"/>            | DK <input checked="" type="checkbox"/> |
| Seafood collecting     | Intense <input type="checkbox"/>            | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input checked="" type="checkbox"/> | DK <input type="checkbox"/>            |
| Wildlife watching      | Intense <input type="checkbox"/>            | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input checked="" type="checkbox"/> | DK <input type="checkbox"/>            |
| Sunbathing and similar | Intense <input checked="" type="checkbox"/> | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input type="checkbox"/>            | DK <input type="checkbox"/>            |
| Scuba diving           | Intense <input type="checkbox"/>            | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input type="checkbox"/>            | DK <input checked="" type="checkbox"/> |
| Sailing and similar    | Intense <input type="checkbox"/>            | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input type="checkbox"/>            | DK <input checked="" type="checkbox"/> |
| Other (specify)        | Intense <input type="checkbox"/>            | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input type="checkbox"/>            | DK <input checked="" type="checkbox"/> |

Could you describe those recreational activities before the LCS was built? (DK = Don't know)

- |                        |                                  |                                   |                                 |  |  |
|------------------------|----------------------------------|-----------------------------------|---------------------------------|--|--|
| Fishing (recreational) | Intense <input type="checkbox"/> | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input type="checkbox"/>            | DK <input checked="" type="checkbox"/> |
| Seafood collecting     | Intense <input type="checkbox"/> | Moderate <input type="checkbox"/> | Scarce <input type="checkbox"/> | Absent <input checked="" type="checkbox"/> | DK <input type="checkbox"/>            |

Wildlife watching	Intense <input type="checkbox"/>	Moderate <input type="checkbox"/>	Scarce <input type="checkbox"/>	Absent <input checked="" type="checkbox"/>	DK <input type="checkbox"/>
Sunbathing and similar	Intense <input type="checkbox"/>	Moderate <input type="checkbox"/>	Scarce <input checked="" type="checkbox"/>	Absent <input type="checkbox"/>	DK <input type="checkbox"/>
Scuba diving	Intense <input type="checkbox"/>	Moderate <input type="checkbox"/>	Scarce <input type="checkbox"/>	Absent <input type="checkbox"/>	DK <input checked="" type="checkbox"/>
Sailing and similar	Intense <input type="checkbox"/>	Moderate <input type="checkbox"/>	Scarce <input type="checkbox"/>	Absent <input type="checkbox"/>	DK <input checked="" type="checkbox"/>
Other (specify)	Intense <input type="checkbox"/>	Moderate <input type="checkbox"/>	Scarce <input type="checkbox"/>	Absent <input type="checkbox"/>	DK <input checked="" type="checkbox"/>

Has that LCS had an environmental impact assessment before being built? Yes , No , Don't know   
Could you give its references and location (specify)?

Has there been an economic study on that LCS,  
before it was built? Yes , No , Don't know , References:  
after it was built? Yes , No , Don't know , References:

## G: Ecological aspects

What are the dominant species on the structures?

What are the dominant species in the sediment and fish assemblages around the structures?

Were any environmental changes observed following the construction of the structure (e.g. increase of water turbidity, floating algal debris)?

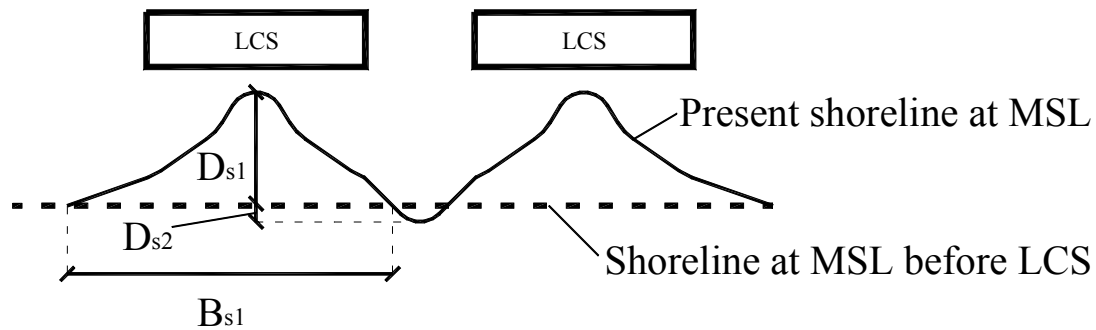
## H: Coastal protection performance

### H1 Bathymetry and beach evolution

Description of historical beach evolution before LCS was built (10-20 years).

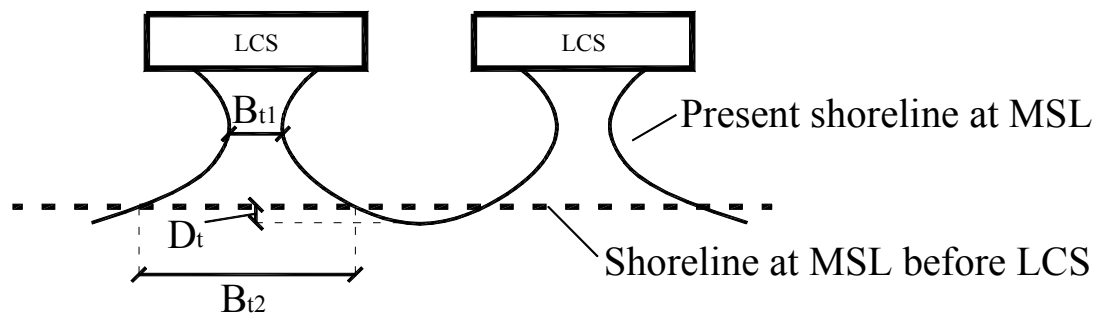
Description of beach evolution after LCS was built up to now.

### H2 Salient formation



Parameter	Description	Fill in box	unit
$D_{s1}$	Max distance between new and old shoreline, seaward		meters
$D_{s2}$	Max distance between new and old shoreline, landward		meters
$B_{s1}$	Width of salient at old MSL		meters

### H3 Tombolo formation



Parameter	Description	Fill in box	unit
$D_t$	Distance between new and old shoreline, landward		meters
$B_{t1}$	Minimal width of tombolo		meters
$B_{t2}$	Width of tombolo at old MSL		meters

## **H4 Renourishment**

**Description of renourishment (add more fill)** (e.g. amount, how often)

## **H5 Down drift erosion**

Please insert a sketch if relevant.

**Description of down drift erosion** (morphological impact, e.g. down drift erosion length and maximal down drift shoreline retreat)

## **I: Problems in general**

**Description of other problems/impacts**

---