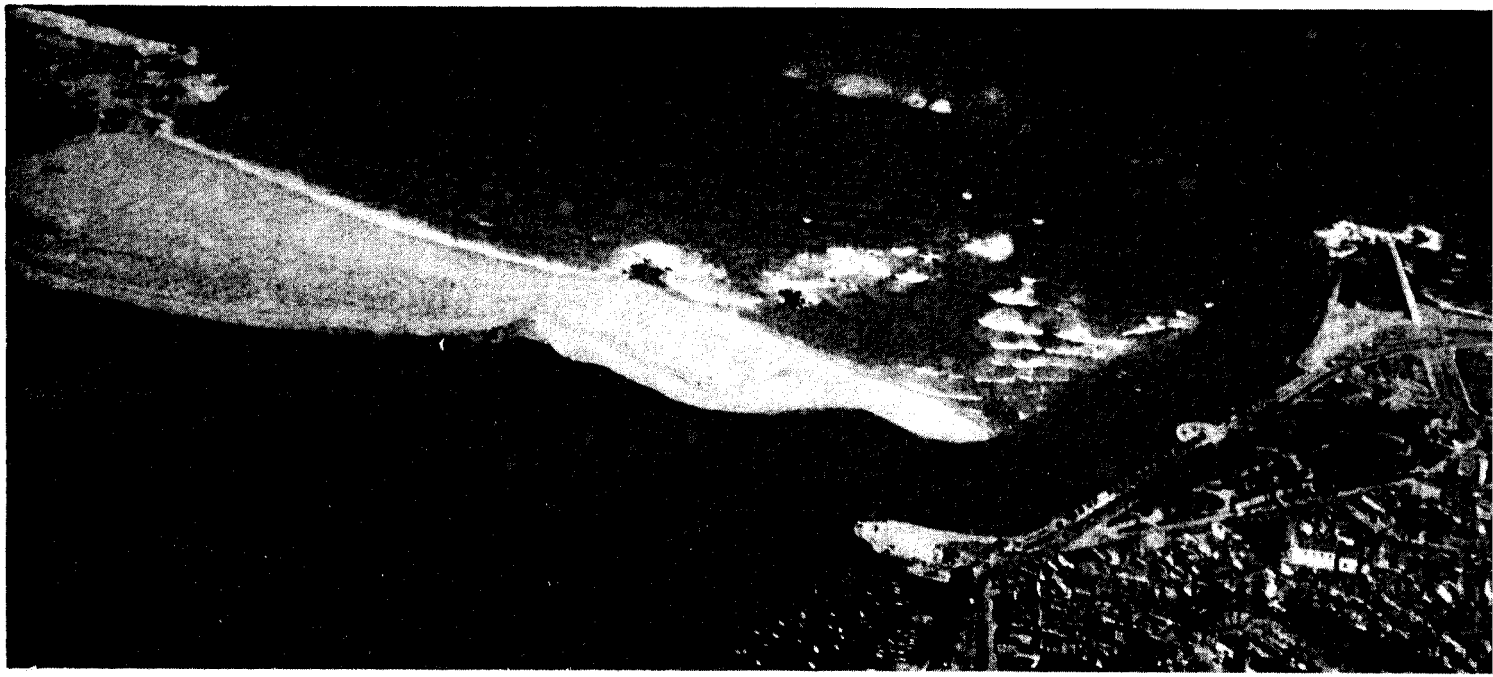
ADMINISTRAÇÃO DOS PORTOS DO DOURO E LEIXÕES

Hydro-morphological study Douro Estua

Part 2
Longshore transport calculations
Annex: computer output



november 1982 / P613

PORT AND WATERWAY ENGINEERS

ADMINISTRAÇÂO DOS PORTOS DO DOURO E LEIXÕES

Hydro-morphological study Douro Estuary

Part 2
Longshore transport calculations
Annex: computer output

november 1982 / P613

PORT AND WATERWAY ENGINEERS

hydronamic bv
sliedrecht holland

Calculated transport in profile 1

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 2
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 28.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.14 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 18.53% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.47 M
BREAKERANGLE 10. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	.90	.00	.41	73.36	2.87	.01	80.08	-.08	-1.	IVVVVV IS
9.17	.0186	.91	.00	.44	72.68	2.79	.01	77.76	-.08	-2.	IVVVVV IS
8.33	.0186	.93	.00	.48	71.94	2.70	.01	75.19	-.08	-3.	IVVVV IS
7.50	.0186	.94	.01	.53	71.12	2.61	.01	72.33	-.07	-5.	IVVVV IS
6.67	.0106	.96	.01	.59	70.20	2.52	.01	69.15	-.04	-4.	IVV IS
5.83	.0106	.99	.01	.66	69.16	2.42	.01	65.57	-.04	-6.	IVV IS
5.00	.0417	1.02	.01	.75	67.96	2.32	.01	61.55	-.13	-29.	IVVVVVVV IS
4.17	.0417	1.06	.01	.87	66.55	2.20	.01	56.97	-.09	-30.	IVVVVVV ISS
3.33	.0417	1.11	.02	1.04	64.82	2.06	.01	51.69	.09	45.	IVVVVV ISSS
2.50	.0185	1.16	.03	1.27	62.62	1.92	.01	45.47	.41	282.	IVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSS
1.67	.0185	1.10	.04	1.50	59.56	1.77	.01	37.84	.93	887.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.70	.17	1.27	55.39	1.69	.01	29.28	.96	883.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 420609. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 90839. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1
==

```
PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                 KAPPA=    .38                      DELTA=1.650000
           TEMPERATURE=  15.00                BREAKERINDEX= .800000
***********************************************************

SEASON NR  3
 WAVEHEIGHT   1.00 M (HRMS IN DEEP WATER)
 PERIOD       8.00 SEC
 DIRECTION   20.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .77% OF THE YEAR
***********************************************************

REFRACTED WAVEHEIGHT 1.52 M
BREAKERANGLE  8. DEGREES
```

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	.93	.00	.42	73.36	2.85	.01	80.08	-.07	-0.	IVVVVV IS
9.17	.0186	.94	.00	.45	72.68	2.77	.01	77.76	-.06	-0.	IVVVV IS
8.33	.0186	.95	.01	.50	71.94	2.68	.01	75.19	-.06	-0.	IVVVV IS
7.50	.0186	.97	.01	.54	71.12	2.60	.01	72.33	-.06	-0.	IVVVV IS
6.67	.0106	.99	.01	.60	70.20	2.51	.01	69.15	-.03	-0.	IVV IS
5.83	.0106	1.01	.01	.68	69.16	2.41	.01	65.58	-.03	-0.	IVV IS
5.00	.0417	1.04	.01	.77	67.96	2.30	.01	61.55	-.10	-1.	IVVVVVVV ISS
4.17	.0417	1.08	.02	.89	66.55	2.19	.01	56.97	-.07	-1.	IVVVVV IS
3.33	.0417	1.14	.02	1.06	64.83	2.05	.01	51.70	.11	2.	IVVVVVVVVV ISSSS
2.50	.0185	1.19	.03	1.30	62.63	1.91	.01	45.48	.36	11.	IVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.11	.05	1.52	59.58	1.76	.01	37.88	.77	30.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.70	.18	1.27	55.47	1.70	.01	29.43	.78	28.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 13790. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   3016. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 4
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 12.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .51% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.51 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	.94	.00	.43	73.36	2.84	.01	80.08	-.04	-0.	IVVVV
											IS
9.17	.0186	.95	.00	.46	72.68	2.76	.01	77.76	-.04	-0.	IVVVV
											IS
8.33	.0186	.97	.01	.50	71.94	2.67	.01	75.19	-.04	-0.	IVVVV
											IS
7.50	.0186	.99	.01	.55	71.12	2.59	.01	72.33	-.04	-0.	IVVVV
											IS
6.67	.0106	1.01	.01	.61	70.20	2.50	.01	69.15	-.02	-0.	IVV
											IS
5.83	.0106	1.03	.01	.69	69.16	2.40	.01	65.58	-.02	-0.	IVV
											IS
5.00	.0417	1.06	.01	.78	67.96	2.29	.01	61.55	-.06	-0.	IVVVVVVV
											ISS
4.17	.0417	1.10	.02	.91	66.55	2.18	.01	56.98	-.04	-0.	IVVVV
											IS
3.33	.0417	1.16	.02	1.08	64.83	2.05	.01	51.70	.08	1.	IVVVVVVVV
											ISSSSS
2.50	.0185	1.20	.03	1.32	62.63	1.90	.01	45.49	.24	5.	IVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.12	.05	1.53	59.58	1.76	.01	37.88	.52	13.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.70	.18	1.27	55.45	1.70	.01	29.40	.52	11.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 6075. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 1275. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 5
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION .44 DEGREES (AT 10.M DEPTH)
REFR COEF 1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .24% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.53 M
BREAKERANGLE 0. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	.95	.00	.43	73.36	2.83	.01	80.08	.00	0.	IVVV
											IS
9.17	.0186	.96	.00	.47	72.68	2.75	.01	77.76	.00	0.	IVV
											IS
8.33	.0186	.98	.01	.51	71.94	2.67	.01	75.19	.00	0.	IV
											IS
7.50	.0186	.99	.01	.56	71.12	2.58	.01	72.33	.00	0.	IV
											IS
6.67	.0106	1.02	.01	.62	70.20	2.49	.01	69.15	-.00	-0.	IVVVVVVVVVVV
											IS
5.83	.0106	1.04	.01	.69	69.16	2.39	.01	65.58	-.00	-0.	IVVVVVVVVVVV
											ISS
5.00	.0417	1.07	.01	.79	67.96	2.29	.01	61.56	-.00	-0.	IVVVVVVV
											ISS
4.17	.0417	1.11	.02	.92	66.55	2.17	.01	56.98	.00	0.	IVVVVVVVVVVVV
											ISSSSS
3.33	.0417	1.17	.02	1.09	64.83	2.04	.01	51.70	.01	0.	IVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSS
2.50	.0185	1.21	.03	1.33	62.63	1.90	.01	45.49	.01	0.	IVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.13	.05	1.54	59.58	1.76	.01	37.89	.02	0.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.71	.18	1.27	55.47	1.70	.01	29.44	.02	0.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 108. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 23. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

===

PHYSICAL CONSTANTS G= 9.81 RHO=1027.00 KAPPA= .38 TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950 D90= .001600 DELTA=1.650000 BREAKERINDEX= .800000

****

SEASON NR 6
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 28.00 DEGREES (AT 10.M DEPTH)
REFR COEF .93 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR

****

REFRACTED WAVEHEIGHT 3.04 M
BREAKERANGLE 15. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	2.73	.03	1.23	73.38	2.26	.01	80.15	-.19	-4.	VVV S
9.17	.0186	2.76	.04	1.33	72.71	2.20	.01	77.86	-.17	-4.	VVV S
8.33	.0186	2.79	.04	1.45	71.97	2.15	.01	75.31	-.12	-3.	VV S
7.50	.0186	2.83	.05	1.58	71.16	2.09	.01	72.49	-.02	-1.	V S
6.67	.0106	2.86	.06	1.73	70.26	2.03	.01	69.34	.09	3.	V S
5.83	.0106	2.86	.06	1.90	69.23	1.97	.01	65.82	.28	10.	VVVVV SS
5.00	.0417	2.81	.07	2.05	68.05	1.91	.01	61.83	1.85	86.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSS
4.17	.0417	2.67	.06	2.18	66.64	1.85	.01	57.25	2.66	164.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0417	2.41	.10	2.22	65.02	1.80	.01	52.26	3.21	251.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	1.99	.24	2.09	63.24	1.77	.01	47.14	1.97	104.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.42	.44	1.73	61.18	1.77	.01	41.72	1.93	93.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.74	.68	1.08	58.61	1.85	.01	35.71	1.75	69.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 134433. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 22533. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

****

SEASON NR 7
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 21.00 DEGREES (AT 10.M DEPTH)
REFR COEF .92 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

****

REFRACTED WAVEHEIGHT 3.07 M
BREAKERANGLE 11. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	2.79	.03	1.26	73.38	2.25	.01	80.15	-.15	-1.	IVVV IS
9.17	.0186	2.82	.04	1.36	72.71	2.20	.01	77.86	-.13	-1.	IVV IS
8.33	.0186	2.85	.04	1.48	71.97	2.14	.01	75.32	-.10	-1.	IVV IS
7.50	.0186	2.88	.05	1.61	71.16	2.08	.01	72.50	-.02	-0.	IV IS
6.67	.0106	2.91	.06	1.76	70.26	2.02	.01	69.35	.07	1.	IV IS
5.83	.0106	2.91	.06	1.93	69.23	1.96	.01	65.83	.23	2.	IVVVV ISS
5.00	.0417	2.85	.07	2.08	68.05	1.90	.01	61.84	1.57	21.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSS
4.17	.0417	2.70	.06	2.20	66.64	1.84	.01	57.26	2.29	39.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0417	2.42	.11	2.24	65.03	1.80	.01	52.29	2.77	57.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	2.00	.24	2.10	63.25	1.77	.01	47.18	1.67	25.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.42	.44	1.73	61.20	1.77	.01	41.79	1.64	22.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.74	.69	1.07	58.65	1.86	.01	35.80	1.51	16.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 32316. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 5349. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
===========================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
             RHO=1027.00                          D90= .001600
           KAPPA=    .38                        DELTA=1.650000
     TEMPERATURE=  15.00                 BREAKERINDEX= .800000
*******************************************************************


SEASON NR  8
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      10.00 SEC
 DIRECTION   30.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.25% OF THE YEAR
*******************************************************************


REFRACTED WAVEHEIGHT 1.70 M
BREAKERANGLE 10. DEGREES

  D    ALFA   H   SETUP  U1   C    KSI    R    L       V       S
10.00 .0186   .96  .00  .48 73.36  2.62  .01106.30  -.09      -0. |VVVV
                                                                  |S
 9.17 .0186   .98  .01  .52 72.68  2.55  .01102.66  -.08      -0. |VVV
                                                                  |S
 8.33 .0186   .99  .01  .56 71.94  2.48  .01 98.74  -.08      -1. |VVV
                                                                  |S
 7.50 .0186  1.02  .01  .61 71.12  2.41  .01 94.48  -.07      -1. |VVV
                                                                  |S
 6.67 .0106  1.04  .01  .68 70.20  2.33  .01 89.85  -.04      -1. |V
                                                                  |S
 5.83 .0106  1.07  .01  .75 69.16  2.25  .01 84.78  -.03      -1. |V
                                                                  |S
 5.00 .0417  1.11  .01  .85 67.96  2.15  .01 79.18  -.10      -3. |VVVV
                                                                  |S
 4.17 .0417  1.15  .02  .98 66.55  2.05  .01 72.93   .04       2. |V
                                                                  |S
 3.33 .0417  1.21  .03 1.17 64.84  1.93  .01 65.87   .61      44. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSS
 2.50 .0185  1.26  .04 1.41 62.64  1.80  .01 57.70   .87      86. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0185  1.15  .06 1.59 59.64  1.68  .01 47.97  1.25     157. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0185   .71  .21 1.27 55.73  1.64  .01 37.60  1.12     127. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    76237. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    17295. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
=========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                          D90= .001600
               KAPPA=     .38                       DELTA=1.650000
         TEMPERATURE=   15.00                 BREAKERINDEX= .800000
*******************************************************************


SEASON NR  9
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  26.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING  23.34% OF THE YEAR
*******************************************************************


REFRACTED WAVEHEIGHT 1.73 M
BREAKERANGLE  9. DEGREES

   D    ALFA   H   SETUP  U1   C     KSI    R    L       V        S
10.00 .0186   .98   .00  .49 73.36  2.61  .01106.30  -.08      -3.  |VVVV
                                                                     |S
 9.17 .0186   .99   .01  .53 72.68  2.54  .01102.66  -.07      -4.  |VVV
                                                                     |S
 8.33 .0186  1.01   .01  .57 71.94  2.48  .01 98.74  -.07      -6.  |VVV
                                                                     |S
 7.50 .0186  1.03   .01  .62 71.12  2.40  .01 94.48  -.06      -8.  |VVV
                                                                     |S
 6.67 .0106  1.06   .01  .69 70.20  2.32  .01 89.85  -.03      -6.  |V
                                                                     |S
 5.83 .0106  1.09   .01  .77 69.16  2.24  .01 84.78  -.03      -8.  |V
                                                                     |S
 5.00 .0417  1.13   .01  .87 67.97  2.15  .01 79.18  -.09     -32.  |VVVV
                                                                     |S
 4.17 .0417  1.17   .02 1.00 66.55  2.04  .01 72.94   .05      24.  |VV
                                                                     |S
 3.33 .0417  1.23   .03 1.19 64.84  1.93  .01 65.88   .59     454.  |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSS
 2.50 .0185  1.27   .04 1.43 62.65  1.80  .01 57.71   .82     839.  |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0185  1.16   .06 1.60 59.65  1.68  .01 47.99  1.16    1480.  |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0185   .71   .22 1.27 55.77  1.64  .01 37.69  1.03    1174.  |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   719590. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   164057. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

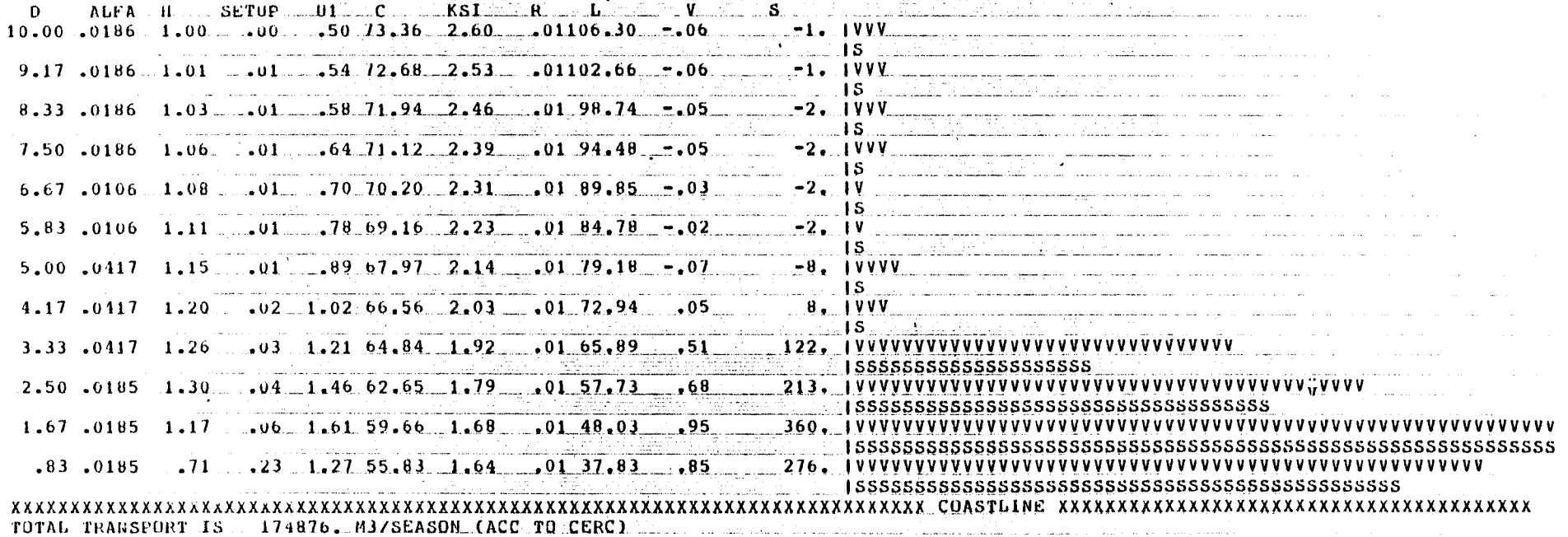
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 10
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 19.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 7.26% OF THE YEAR

REFRACTED WAVEHEIGHT 1.77 M
BREAKERANGLE 7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	1.00	.00	.50	73.36	2.60	.01	106.30	-.06	-1.	
9.17	.0186	1.01	.01	.54	72.68	2.53	.01	102.66	-.06	-1.	
8.33	.0186	1.03	.01	.58	71.94	2.46	.01	98.74	-.05	-2.	
7.50	.0186	1.06	.01	.64	71.12	2.39	.01	94.48	-.05	-2.	
6.67	.0106	1.08	.01	.70	70.20	2.31	.01	89.85	-.03	-2.	
5.83	.0106	1.11	.01	.78	69.16	2.23	.01	84.78	-.02	-2.	
5.00	.0417	1.15	.01	.89	67.97	2.14	.01	79.18	-.07	-8.	
4.17	.0417	1.20	.02	1.02	66.56	2.03	.01	72.94	.05	8.	
3.33	.0417	1.26	.03	1.21	64.84	1.92	.01	65.89	.51	122.	
2.50	.0185	1.30	.04	1.46	62.65	1.79	.01	57.73	.68	213.	
1.67	.0185	1.17	.06	1.61	59.66	1.68	.01	48.03	.95	360.	
.83	.0185	.71	.23	1.27	55.83	1.64	.01	37.83	.85	276.	



TOTAL TRANSPORT IS 174876. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 40149. M3/SEASON (ACC TO BIJKER)

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     HYDRONAMIC BV
     PORT & WATERWAY ENGINEERS
     SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
=========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00              BREAKERINDEX= .800000
****************************************************************


SEASON NR 11
 WAVEHEIGHT   1.00 M (HRMS IN DEEP WATER)
 PERIOD      10.00 SEC
 DIRECTION   12.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .64% OF THE YEAR
****************************************************************


REFRACTED WAVEHEIGHT 1.80 M
BREAKERANGLE   4. DEGREES

   D    ALFA   H   SETUP   U1    C    KSI    R     L      V      S
 10.00 .0186  1.01   .01   .51 73.36  2.59   .01106.30  -.04       -0. |VVV
                                                                       |S
  9.17 .0186  1.03   .01   .55 72.68  2.52   .01102.66  -.04       -0. |VVV
                                                                       |S
  8.33 .0186  1.05   .01   .59 71.94  2.46   .01 98.74  -.04       -0. |VVV
                                                                       |S
  7.50 .0186  1.07   .01   .65 71.12  2.38   .01 94.49  -.03       -0. |VV
                                                                       |S
  6.67 .0106  1.10   .01   .71 70.20  2.31   .01 89.85  -.02       -0. |V
                                                                       |S
  5.83 .0106  1.13   .01   .79 69.16  2.22   .01 84.78  -.02       -0. |V
                                                                       |S
  5.00 .0417  1.17   .02   .90 67.97  2.13   .01 79.19  -.04       -0. |VVV
                                                                       |S
  4.17 .0417  1.22   .02  1.04 66.56  2.03   .01 72.95   .04        1. |VVV
                                                                       |S
  3.33 .0417  1.28   .03  1.23 64.84  1.91   .01 65.90   .37        8. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSS
  2.50 .0185  1.31   .04  1.47 62.65  1.79   .01 57.74   .48       13. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  1.67 .0185  1.18   .07  1.62 59.67  1.68   .01 48.06   .67       21. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
   .83 .0185   .72   .23  1.27 55.87  1.64   .01 37.92   .60       16. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     10185. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      2353. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

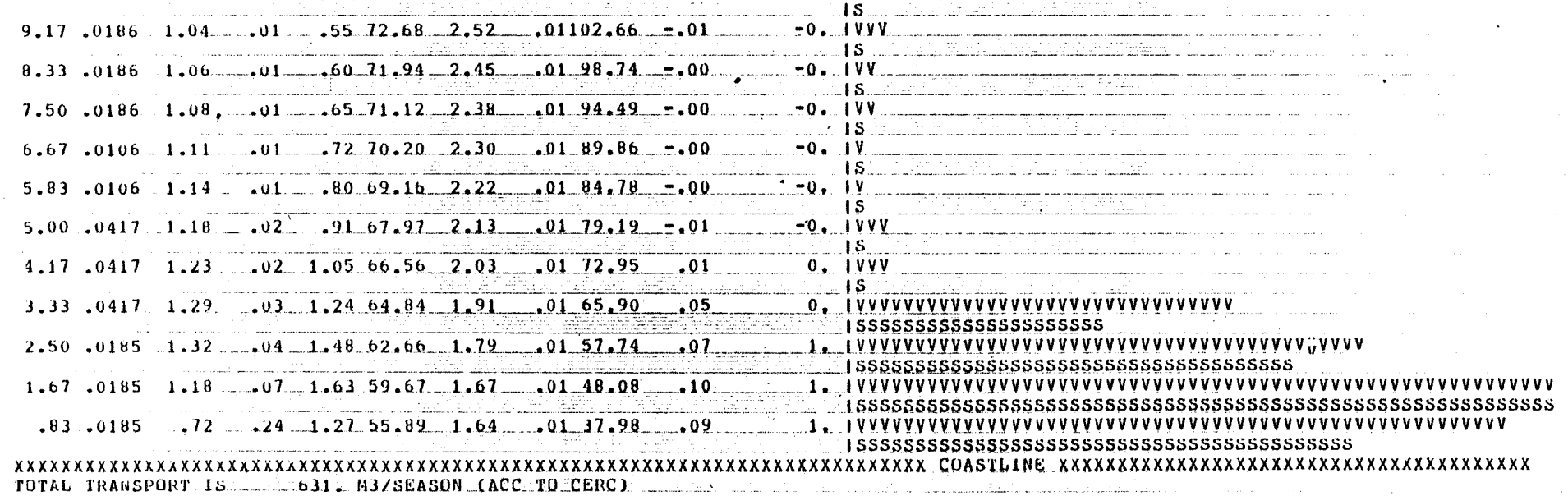
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 12
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 1.54 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .30% OF THE YEAR

REFRACTED WAVEHEIGHT 1.81 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	1.02	.01	.51	73.36	2.58	.01	106.30	-.01	-0.	
9.17	.0186	1.04	.01	.55	72.68	2.52	.01	102.66	-.01	-0.	
8.33	.0186	1.06	.01	.60	71.94	2.45	.01	98.74	-.00	-0.	
7.50	.0186	1.08	.01	.65	71.12	2.38	.01	94.49	-.00	-0.	
6.67	.0106	1.11	.01	.72	70.20	2.30	.01	89.86	-.00	-0.	
5.83	.0106	1.14	.01	.80	69.16	2.22	.01	84.78	-.00	-0.	
5.00	.0417	1.18	.02	.91	67.97	2.13	.01	79.19	-.01	-0.	
4.17	.0417	1.23	.02	1.05	66.56	2.03	.01	72.95	.01	0.	
3.33	.0417	1.29	.03	1.24	64.84	1.91	.01	65.90	.05	0.	
2.50	.0185	1.32	.04	1.48	62.66	1.79	.01	57.74	.07	1.	
1.67	.0185	1.18	.07	1.63	59.67	1.67	.01	48.08	.10	1.	
.83	.0185	.72	.24	1.27	55.89	1.64	.01	37.98	.09	1.	



TOTAL TRANSPORT IS 631. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 149. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00              BREAKERINDEX= .800000
***********************************************************

SEASON NR 13
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      10.00 SEC
 DIRECTION   31.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .95 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .69% OF THE YEAR
***********************************************************


REFRACTED WAVEHEIGHT 3.29 M
BREAKERANGLE 15. DEGREES

   D    ALFA    H    SETUP  U1    C    KSI    R     L       V       S
10.00 .0186  2.89   .04  1.44 73.39  2.10   .01106.45   -.15     -4. |VV
                                                                     |S
 9.17 .0186  2.93   .05  1.55 72.72  2.06   .01102.85   -.11     -3. |V
                                                                     |S
 8.33 .0186  2.98   .05  1.68 71.98  2.01   .01 98.97   -.02     -1. |V
                                                                     |S
 7.50 .0186  3.03   .06  1.82 71.18  1.96   .01 94.78    .14      5. |VV
                                                                     |S
 6.67 .0106  3.06   .07  1.97 70.27  1.91   .01 90.21    .26      9. |VVVV
                                                                     |S
 5.83 .0106  3.06   .08  2.14 69.25  1.86   .01 85.21    .54     20. |VVVVVVVV
                                                                     |SSS
 5.00 .0417  2.99   .08  2.28 68.07  1.80   .01 79.65   2.66    159. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  2.81   .07  2.38 66.66  1.75   .01 73.38   3.42    285. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.50   .15  2.36 65.11  1.72   .01 66.97   3.82    390. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.04   .29  2.18 63.38  1.69   .01 60.34   2.30    132. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0185  1.44   .50  1.76 61.41  1.70   .01 53.50   2.19    112. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSS
  .83 .0185   .74   .75  1.07 58.98  1.79   .01 46.05   1.96     81. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   167701. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    33472. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

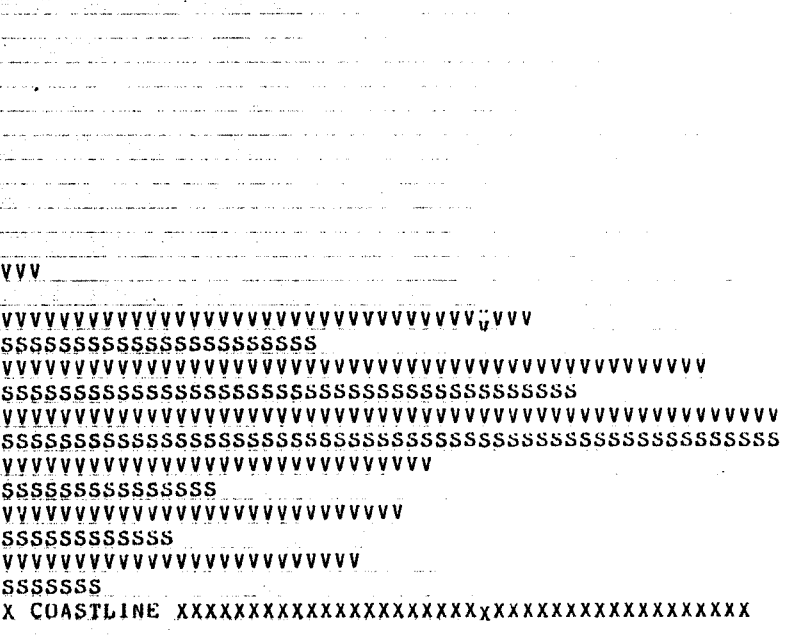
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 14
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 26.00 DEGREES (AT 10.M DEPTH)
REFR COEF .96 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 7.35% OF THE YEAR

REFRACTED WAVEHEIGHT 3.39 M
BREAKERANGLE 12. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	2.94	.04	1.47	73.39	2.10	.01	106.46	-.14	-36.	
9.17	.0186	2.99	.05	1.58	72.72	2.05	.01	102.86	-.09	-26.	
8.33	.0186	3.04	.06	1.71	71.99	2.00	.01	98.98	-.01	-2.	
7.50	.0186	3.08	.07	1.85	71.18	1.95	.01	94.79	.16	55.	
6.67	.0106	3.11	.07	2.01	70.28	1.90	.01	90.23	.27	98.	
5.83	.0106	3.10	.08	2.17	69.25	1.85	.01	85.22	.53	216.	
5.00	.0417	3.02	.08	2.31	68.07	1.80	.01	79.66	2.58	1624.	
4.17	.0417	2.84	.08	2.40	66.67	1.75	.01	73.43	3.26	2735.	
3.33	.0417	2.54	.16	2.37	65.15	1.72	.01	67.10	3.60	3569.	
2.50	.0185	2.05	.31	2.17	63.44	1.69	.01	60.54	2.14	1243.	
1.67	.0185	1.44	.52	1.75	61.50	1.70	.01	53.79	2.03	1051.	
.83	.0185	.74	.78	1.06	59.11	1.80	.01	46.44	1.83	767.	



TOTAL TRANSPORT IS 1628051. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 320620. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 15
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 20.00 DEGREES (AT 10.M DEPTH)
REFR COEF .96 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.35% OF THE YEAR

REFRACTED WAVEHEIGHT 3.45 M
BREAKERANGLE 10. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	2.99	.04	1.50	73.39	2.09	.01	106.46	-.11	-9.	
9.17	.0186	3.04	.05	1.61	72.72	2.05	.01	102.87	-.07	-7.	
8.33	.0186	3.09	.06	1.74	71.99	2.00	.01	98.99	-.00	-0.	
7.50	.0186	3.13	.07	1.88	71.18	1.95	.01	94.80	.14	16.	
6.67	.0106	3.16	.08	2.04	70.28	1.90	.01	90.24	.23	27.	
5.83	.0106	3.14	.08	2.19	69.26	1.85	.01	85.24	.46	60.	
5.00	.0417	3.05	.08	2.33	68.07	1.80	.01	79.68	2.28	427.	
4.17	.0417	2.86	.09	2.41	66.68	1.75	.01	73.49	2.88	679.	
3.33	.0417	2.53	.17	2.38	65.17	1.72	.01	67.18	3.17	850.	
2.50	.0185	2.05	.32	2.17	63.47	1.70	.01	60.66	1.84	319.	
1.67	.0185	1.44	.54	1.75	61.55	1.71	.01	53.96	1.76	270.	
.83	.0185	.74	.80	1.05	59.20	1.80	.01	46.68	1.60	196.	

TOTAL TRANSPORT IS 424604. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 81235. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                       D90= .001600
                KAPPA=     .38                    DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
***********************************************************


SEASON NR 16
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      10.00 SEC
 DIRECTION   12.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .97 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .21% OF THE YEAR
***********************************************************


REFRACTED WAVEHEIGHT 3.54 M
BREAKERANGLE   6. DEGREES

  D     ALFA    H   SETUP   U1    C     KSI     R    L        V      S
10.00 .0186  3.04   .05  1.52 73.39  2.09   .01106.47  -.07      -1. |V
                                                                     |S
 9.17 .0186  3.09   .05  1.63 72.72  2.04   .01102.88  -.04      -0. |V
                                                                     |S
 8.33 .0186  3.13   .06  1.76 71.99  1.99   .01 99.00   .01       0. |V
                                                                     |S
 7.50 .0186  3.17   .07  1.91 71.18  1.94   .01 94.81   .11       1. |VV
                                                                     |S
 6.67 .0106  3.20   .08  2.06 70.28  1.89   .01 90.25   .16       2. |VVVV
                                                                     |SS
 5.83 .0106  3.18   .08  2.22 69.26  1.84   .01 85.25   .32       4. |VVVVVVVV
                                                                     |SSSSS
 5.00 .0417  3.08   .09  2.35 68.08  1.80   .01 79.69  1.70      25. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  2.88   .10  2.43 66.70  1.75   .01 73.56  2.15      37. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.54   .18  2.38 65.20  1.72   .01 67.30  2.37      44. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.06   .34  2.17 63.52  1.70   .01 60.85  1.31      18. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0185  1.45   .56  1.74 61.63  1.71   .01 54.23  1.27      15. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSS
  .83 .0185   .74   .82  1.04 59.32  1.81   .01 47.03  1.20      11. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSS
 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 TOTAL TRANSPORT IS    24512. M3/SEASON (ACC TO CERC)
 TOTAL TRANSPORT IS     4542. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
==============================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
              RHO=1027.00                          D90= .001600
            KAPPA=    .38                        DELTA=1.650000
      TEMPERATURE=  15.00                 BREAKERINDEX= .800000
************************************************************


SEASON NR 17
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION   1.53 DEGREES (AT 10.M DEPTH)
 REFR COEF    .98 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .10% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 3.61 M
BREAKERANGLE  1. DEGREES

  D    ALFA   H    SETUP  U1   C    KSI   R    L     V      S
10.00 .0186  3.07   .05 1.53 73.39 2.08  .01106.47 -.01     -0. |V
                                                                 |S
 9.17 .0186  3.11   .05 1.65 72.72 2.04  .01102.88 -.01     -0. |V
                                                                 |S
 8.33 .0186  3.16   .06 1.78 71.99 1.99  .01 99.01  .00      0. |V
                                                                 |S
 7.50 .0186  3.20   .07 1.92 71.18 1.94  .01 94.82  .02      0. |VV
                                                                 |S
 6.67 .0106  3.22   .08 2.08 70.28 1.89  .01 90.26  .02      0. |VVV
                                                                 |SS
 5.83 .0106  3.20   .09 2.23 69.26 1.84  .01 85.25  .05      0. |VVVVVV
                                                                 |SSSSS
 5.00 .0417  3.10   .09 2.36 68.08 1.79  .01 79.69  .28      2. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  2.89   .10 2.43 66.71 1.75  .01 73.62  .38      2. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.54   .19 2.38 65.22 1.72  .01 67.39  .43      3. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.06   .35 2.17 63.55 1.70  .01 60.98  .20      1. |VVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0185  1.45   .58 1.73 61.68 1.71  .01 54.42  .21      1. |VVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSS
  .83 .0185   .74   .84 1.04 59.41 1.81  .01 47.29  .23      1. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     1564. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      291. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 18
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 29.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.37 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .63% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.98 M
BREAKERANGLE 10. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	1.04	.01	.55	73.36	2.45	.01	131.64	-.08	-0.	VVV S
9.17	.0186	1.05	.01	.59	72.68	2.39	.01	126.78	-.08	-0.	VVV S
8.33	.0186	1.08	.01	.63	71.94	2.33	.01	121.60	-.07	-0.	VV S
7.50	.0186	1.10	.01	.69	71.12	2.27	.01	116.04	-.07	-0.	VV S
6.67	.0106	1.13	.01	.76	70.20	2.20	.01	110.06	-.03	-0.	V S
5.83	.0106	1.17	.01	.84	69.17	2.12	.01	103.57	-.03	-0.	V S
5.00	.0417	1.21	.02	.95	67.97	2.04	.01	96.48	.01	0.	V S
4.17	.0417	1.26	.02	1.09	66.56	1.94	.01	88.66	.43	7.	VVVVVVVVVVVVVVVVVV SSSSSSS
3.33	.0417	1.32	.03	1.29	64.85	1.84	.01	79.90	1.32	37.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	1.35	.04	1.53	62.66	1.72	.01	69.84	1.26	40.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.20	.08	1.66	59.72	1.62	.01	58.14	1.43	53.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.72	.27	1.26	56.12	1.60	.01	46.37	1.21	38.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 28341. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 6737. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
==================================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                      D90= .001600
               KAPPA=    .38                    DELTA=1.650000
         TEMPERATURE=  15.00              BREAKERINDEX= .800000
***********************************************************


SEASON NR 19
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  24.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.38 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   6.87% OF THE YEAR
***********************************************************


REFRACTED WAVEHEIGHT 2.03 M
BREAKERANGLE  8. DEGREES

  D     ALFA   H   SETUP  U1   C     KSI    R    L      V       S
10.00  .0186  1.06  .01  .56 73.36  2.44  .01131.64  -.07     -1. |VVV
                                                                  |S
 9.17  .0186  1.08  .01  .60 72.68  2.38  .01126.78  -.07     -2. |VVV
                                                                  |S
 8.33  .0186  1.10  .01  .65 71.94  2.32  .01121.60  -.06     -2. |VV
                                                                  |S
 7.50  .0186  1.12  .01  .70 71.12  2.26  .01116.04  -.06     -3. |VV
                                                                  |S
 6.67  .0106  1.15  .01  .77 70.20  2.19  .01110.06  -.03     -2. |V
                                                                  |S
 5.83  .0106  1.19  .01  .86 69.17  2.11  .01103.58  -.02     -2. |V
                                                                  |S
 5.00  .0417  1.23  .02  .97 67.97  2.03  .01 96.49   .02      3. |V
                                                                  |S
 4.17  .0417  1.28  .02 1.12 66.56  1.93  .01 88.67   .44     80. |VVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSS
 3.33  .0417  1.34  .03 1.32 64.85  1.83  .01 79.91  1.27    385. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50  .0185  1.37  .04 1.56 62.67  1.72  .01 69.86  1.17    401. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67  .0185  1.21  .08 1.67 59.73  1.62  .01 58.20  1.29    505. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83  .0185   .72  .28 1.25 56.19  1.60  .01 46.59  1.09    358. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   274786. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    65614. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

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PHYSICAL CONSTANTS G= 9.81 — COASTAL CONSTANTS D50= .000950
RHO=1027.00 — D90= .001600
KAPPA= .38 — DELTA=1.650000
TEMPERATURE= 15.00 — BREAKERINDEX= .800000

****

SEASON NR 20
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.37 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.14% OF THE YEAR

****

REFRACTED WAVEHEIGHT 2.05 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	1.08	.01	.57	73.36	2.43	.01	131.64	-.05	-0.	IVVV IS
9.17	.0186	1.09	.01	.61	72.68	2.37	.01	126.78	-.05	-0.	IVV IS
8.33	.0186	1.12	.01	.66	71.94	2.31	.01	121.60	-.05	-1.	IVV IS
7.50	.0186	1.14	.01	.72	71.12	2.25	.01	116.05	-.04	-1.	IVV IS
6.67	.0106	1.17	.01	.79	70.20	2.18	.01	110.06	-.02	-1.	IV IS
5.83	.0106	1.21	.01	.87	69.17	2.10	.01	103.58	-.02	-1.	IV IS
5.00	.0417	1.25	.02	.99	67.97	2.02	.01	96.50	.02	1.	IV IS
4.17	.0417	1.31	.02	1.14	66.56	1.93	.01	88.68	.36	20.	IVVVVVVVVVVVVVVVVVVVV ISSSSSSSSS
3.33	.0417	1.37	.03	1.34	64.85	1.82	.01	79.92	1.07	96.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	1.39	.05	1.58	62.67	1.71	.01	69.88	.97	99.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.22	.08	1.68	59.74	1.62	.01	58.23	1.07	123.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0185	.72	.28	1.25	56.22	1.60	.01	46.67	.91	85.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 66723. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 15985. M3/SEASON (ACC TO BIJKER)

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     HYDRONAMIC BV
     PORT & WATERWAY ENGINEERS
     SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
===============================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00               BREAKERINDEX= .800000
*****************************************************************


SEASON NR 21
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  12.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.38 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .19% OF THE YEAR
*****************************************************************


REFRACTED WAVEHEIGHT 2.09 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP   U1   C    KSI    R     L      V      S
10.00 .0186  1.09   .01   .57 73.36  2.43  .01131.64  -.04      -0. |VV
                                                                    |S
 9.17 .0186  1.11   .01   .62 72.68  2.37  .01126.78  -.04      -0. |VV
                                                                    |S
 8.33 .0186  1.13   .01   .67 71.94  2.31  .01121.60  -.03      -0. |VV
                                                                    |S
 7.50 .0186  1.16   .01   .73 71.12  2.24  .01116.05  -.03      -0. |VV
                                                                    |S
 6.67 .0106  1.19   .01   .80 70.20  2.17  .01110.07  -.02      -0. |V
                                                                    |S
 5.83 .0106  1.23   .01   .89 69.17  2.10  .01103.58  -.01      -0. |V
                                                                    |S
 5.00 .0417  1.27   .02  1.00 67.97  2.02  .01 96.50   .02       0. |V
                                                                    |S.
 4.17 .0417  1.32   .02  1.15 66.57  1.92  .01 88.68   .28       1. |VVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSS
 3.33 .0417  1.38   .03  1.35 64.86  1.82  .01 79.93   .84       6. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  1.40   .05  1.59 62.68  1.71  .01 69.90   .73       6. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0185  1.22   .09  1.69 59.75  1.62  .01 58.27   .79       8. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0185   .72   .29  1.25 56.28  1.60  .01 46.84   .68       5. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS      4159. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS       999. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

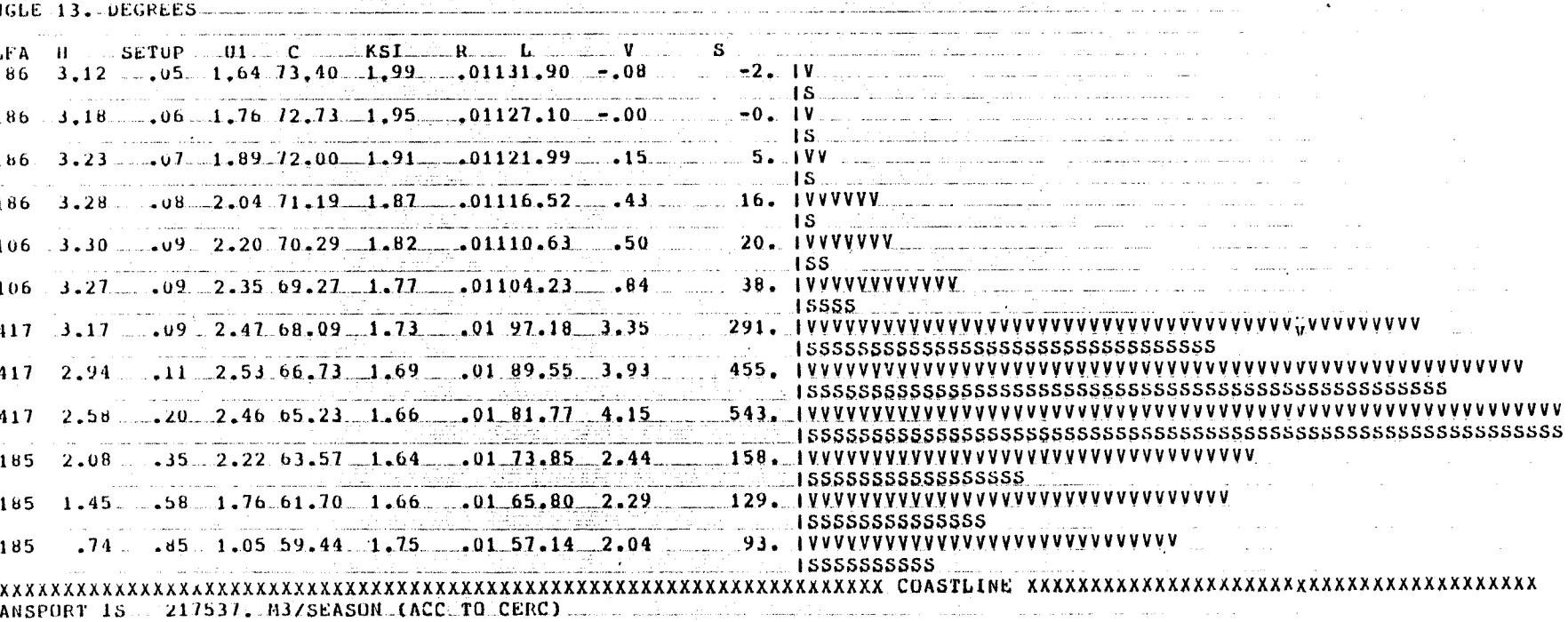
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 22
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 29.00 DEGREES (AT 10.M DEPTH)
REFR COEF .98 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .76% OF THE YEAR

REFRACTED WAVEHEIGHT 3.03 M
BREAKERANGLE 13. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	3.12	.05	1.64	73.40	1.99	.01	131.90	-.08	-2.	
9.17	.0186	3.18	.06	1.76	72.73	1.95	.01	127.10	-.00	-0.	
8.33	.0186	3.23	.07	1.89	72.00	1.91	.01	121.99	.15	5.	
7.50	.0186	3.28	.08	2.04	71.19	1.87	.01	116.52	.43	16.	
6.67	.0106	3.30	.09	2.20	70.29	1.82	.01	110.63	.50	20.	
5.83	.0106	3.27	.09	2.35	69.27	1.77	.01	104.23	.84	38.	
5.00	.0417	3.17	.09	2.47	68.09	1.73	.01	97.18	3.35	291.	
4.17	.0417	2.94	.11	2.53	66.73	1.69	.01	89.55	3.93	455.	
3.33	.0417	2.58	.20	2.46	65.23	1.66	.01	81.77	4.15	543.	
2.50	.0185	2.08	.35	2.22	63.57	1.64	.01	73.85	2.44	158.	
1.67	.0185	1.45	.58	1.76	61.70	1.66	.01	65.80	2.29	129.	
.83	.0185	.74	.85	1.05	59.44	1.75	.01	57.14	2.04	93.	



TOTAL TRANSPORT IS 217537. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 46329. M3/SEASON (ACC TO BIJKER)

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     HYDRONAMIC BV
     PORT & WATERWAY ENGINEERS
     SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
=============================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                        D90= .001600
                KAPPA=    .38                     DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
*****************************************************************


SEASON NR 23
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  25.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .99 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   8.23% OF THE YEAR
*****************************************************************


REFRACTED WAVEHEIGHT 3.72 M
BREAKERANGLE 12. DEGREES

  D    ALFA   H    SETUP  U1   C     KSI    R     L      V        S
10.00 .0186  3.17   .05  1.67 73.40  1.99   .01131.91  -.07      -23. IV
                                                                       IS
 9.17 .0186  3.22   .06  1.79 72.73  1.95   .01127.11   .01        3. IV
                                                                       IS
 8.33 .0186  3.27   .07  1.92 72.00  1.91   .01122.00   .17       62. IVV
                                                                       IS
 7.50 .0186  3.32   .08  2.07 71.19  1.86   .01116.53   .44      180. IVVVVVV
                                                                       ISS
 6.67 .0106  3.34   .09  2.22 70.29  1.82   .01110.65   .50      222. IVVVVVVV
                                                                       ISS
 5.83 .0106  3.31   .10  2.37 69.28  1.77   .01104.25   .82      403. IVVVVVVVVVVVV
                                                                       ISSSS
 5.00 .0417  3.19   .10  2.49 68.09  1.73   .01 97.19  3.23     2929. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  2.96   .12  2.54 66.74  1.69   .01 89.64  3.75     4367. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.59   .21  2.46 65.26  1.66   .01 81.92  3.93     5044. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.08   .37  2.22 63.61  1.64   .01 74.07  2.29     1532. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSSSSSS
 1.67 .0185  1.46   .60  1.75 61.78  1.66   .01 66.12  2.15     1250. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSS
  .83 .0185   .74   .88  1.04 59.56  1.75   .01 57.56  1.92      908. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS  2171555. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   471990. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
==========================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                 KAPPA=    .38                     DELTA=1.650000
           TEMPERATURE=  15.00               BREAKERINDEX= .800000
*************************************************************

SEASON NR 24
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION   19.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.00 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.56% OF THE YEAR
*************************************************************


REFRACTED WAVEHEIGHT 3.83 M
BREAKERANGLE   9. DEGREES

   D    ALFA   H    SETUP   U1    C    KSI    R     L       V        S
10.00 .0186  3.22   .06  1.70 73.40  1.98  .01131.92  -.05     -5. IV
                                                                   IS
 9.17 .0186  3.28   .06  1.82 72.73  1.94  .01127.12   .02      2. IV
                                                                   IS
 8.33 .0186  3.33   .07  1.95 72.00  1.90  .01122.01   .16     19. IVV
                                                                   IS
 7.50 .0186  3.37   .08  2.10 71.20  1.86  .01116.55   .40     52. IVVVVVV
                                                                   ISS
 6.67 .0106  3.38   .09  2.25 70.30  1.81  .01110.66   .45     62. IVVVVVVV
                                                                   ISSS
 5.83 .0106  3.35   .10  2.40 69.28  1.77  .01104.26   .72    110. IVVVVVVVVVVVV
                                                                   ISSSSS
 5.00 .0417  3.22   .10  2.51 68.10  1.73  .01 97.21  2.89    730. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  2.98   .13  2.55 66.76  1.69  .01 89.75  3.32   1017. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.60   .23  2.47 65.29  1.66  .01 82.08  3.46   1130. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.09   .39  2.21 63.67  1.65  .01 74.31  1.97    377. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSS
 1.67 .0185  1.46   .63  1.74 61.87  1.66  .01 66.48  1.86    309. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSS
  .83 .0185,  .74   .90  1.03 59.69  1.76  .01 58.04  1.69    224; IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   553896. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   115060. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 25
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 12.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.00 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .23% OF THE YEAR

REFRACTED WAVEHEIGHT 3.88 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	3.26	.06	1.72	73.40	1.98	.01	131.93	-.04	-0.	
9.17	.0186	3.32	.07	1.84	72.73	1.94	.01	127.13	.01	0.	
8.33	.0186	3.37	.07	1.98	72.00	1.90	.01	122.03	.11	1.	
7.50	.0186	3.41	.08	2.12	71.20	1.85	.01	116.56	.28	3.	
6.67	.0106	3.42	.09	2.28	70.30	1.81	.01	110.68	.31	4.	
5.83	.0106	3.38	.10	2.42	69.28	1.77	.01	104.28	.50	7.	
5.00	.0417	3.24	.10	2.53	68.10	1.72	.01	97.22	2.19	41.	
4.17	.0417	2.99	.14	2.56	66.77	1.69	.01	89.80	2.53	54.	
3.33	.0417	2.61	.23	2.47	65.31	1.66	.01	82.16	2.65	58.	
2.50	.0185	2.09	.40	2.21	63.70	1.65	.01	74.44	1.45	22.	
1.67	.0185	1.46	.64	1.74	61.91	1.67	.01	66.65	1.38	18.	
.83	.0185	.74	.92	1.02	59.75	1.76	.01	58.28	1.30	13.	

TOTAL TRANSPORT IS 32877. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 6469. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 26
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 3.29 DEGREES (AT 10.M DEPTH)
REFR COEF .99 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .11% OF THE YEAR
****

REFRACTED WAVEHEIGHT 3.87 M
BREAKERANGLE 2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	3.29	.06	1.73	73.40	1.98	.01	131.93	-.01	-0.	IV IS
9.17	.0186	3.34	.07	1.85	72.73	1.94	.01	127.14	.00	0.	IV IS
8.33	.0186	3.39	.08	1.99	72.00	1.89	.01	122.03	.03	0.	IV IS
7.50	.0186	3.43	.09	2.14	71.20	1.85	.01	116.57	.08	0.	IVVVV ISSS
6.67	.0106	3.44	.10	2.29	70.30	1.81	.01	110.69	.08	1.	IVVVVV ISSSS
5.83	.0106	3.39	.10	2.43	69.28	1.77	.01	104.29	.14	1.	IVVVVVVVV ISSSSSSS
5.00	.0417	3.26	.10	2.54	68.10	1.72	.01	97.23	.76	5.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0417	3.00	.14	2.57	66.77	1.69	.01	89.80	.92	7.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0417	2.61	.23	2.48	65.31	1.66	.01	82.15	.99	7.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	2.09	.40	2.21	63.69	1.65	.01	74.42	.48	3.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0185	1.46	.64	1.74	61.90	1.67	.01	66.63	.47	2.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSS
.83	.0185	.74	.92	1.02	59.74	1.76	.01	58.24	.50	1.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 4342. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 834. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00              BREAKERINDEX= .800000
*****************************************************************


SEASON NR 27
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  29.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .68 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .12% OF THE YEAR
*****************************************************************


REFRACTED WAVEHEIGHT 3.79 M
BREAKERANGLE 13. DEGREES

  D    ALFA    H   SETUP   U1    C     KSI     R    L        V       S
10.00 .0186  4.58   .11  2.40 73.44  1.87   .01132.20   -.05     -0. |V
                                                                     |S
 9.17 .0186  4.59   .11  2.53 72.77  1.84   .01127.42    .03      0. |V
                                                                     |S
 8.33 .0186  4.56   .12  2.66 72.04  1.81   .01122.31    .17      1. |VV
                                                                     |S
 7.50 .0186  4.47   .12  2.78 71.23  1.78   .01116.81    .44      3. |VVVVVV
                                                                     |SS
 6.67 .0106  4.32   .12  2.87 70.32  1.75   .01110.84    .50      4. |VVVVVVV
                                                                     |SS
 5.83 .0106  4.08   .10  2.92 69.29  1.72   .01104.31    .84      7. |VVVVVVVVVVV
                                                                     |SSSS
 5.00 .0417  3.74   .09  2.92 68.08  1.69   .01 97.10   3.47     59. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  3.31   .15  2.83 66.79  1.66   .01 89.87   4.01     85. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.78   .28  2.61 65.41  1.65   .01 82.67   4.24     95. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.16   .46  2.26 63.86  1.65   .01 75.19   2.52     27. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSS
 1.67 .0185  1.47   .68  1.74 62.05  1.67   .01 67.23   2.39     22. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSS
  .83 .0185   .74   .92  1.02 59.75  1.76   .01 58.28   2.12     16. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    36931. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     8760. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

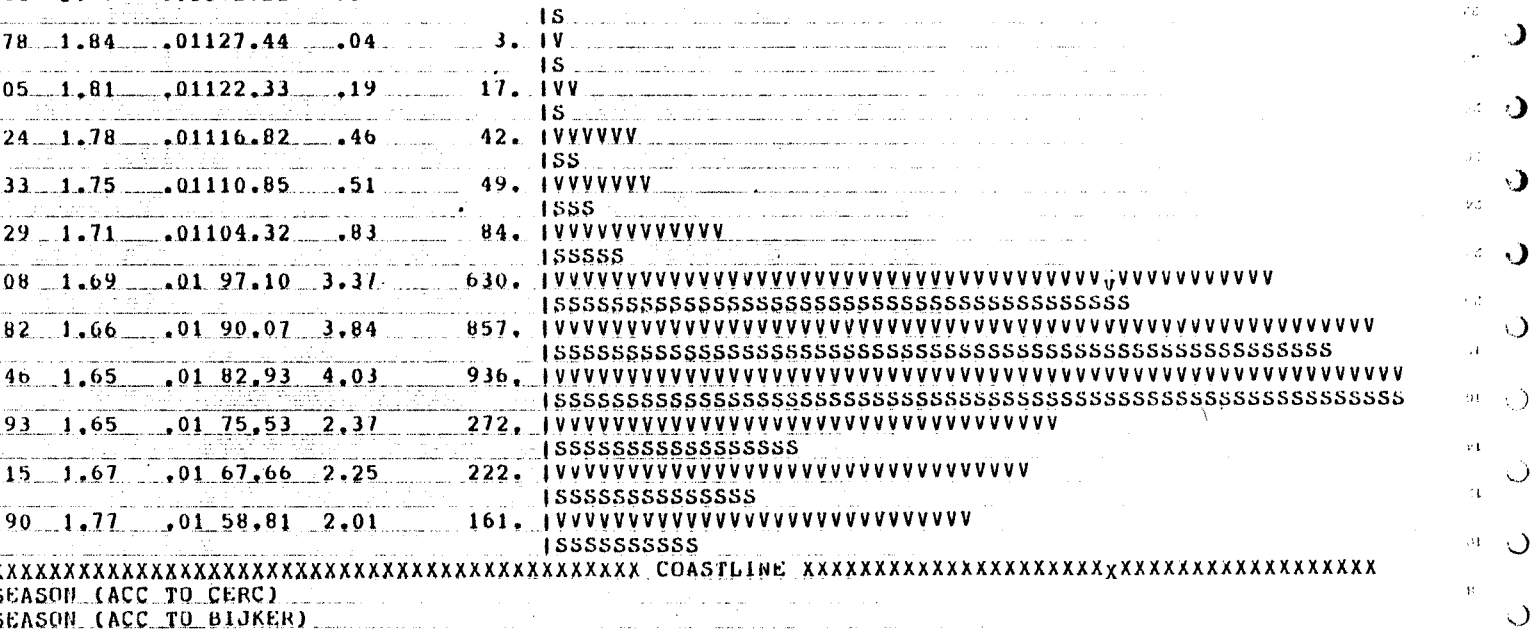
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 28
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 25.00 DEGREES (AT 10.M DEPTH)
REFR COEF .69 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 1.37% OF THE YEAR

REFRACTED WAVEHEIGHT 3.91 M
BREAKERANGLE 11. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	4.64	.11	2.43	73.44	1.87	.01	132.22	-.04	-3.	
9.17	.0186	4.64	.12	2.56	72.78	1.84	.01	127.44	.04	3.	
8.33	.0186	4.60	.12	2.69	72.05	1.81	.01	122.33	.19	17.	
7.50	.0186	4.51	.12	2.80	71.24	1.78	.01	116.82	.46	42.	
6.67	.0106	4.35	.12	2.89	70.33	1.75	.01	110.85	.51	49.	
5.83	.0106	4.10	.11	2.94	69.29	1.71	.01	104.32	.83	84.	
5.00	.0417	3.76	.09	2.94	68.08	1.69	.01	97.10	3.37	630.	
4.17	.0417	3.32	.17	2.83	66.82	1.66	.01	90.07	3.84	857.	
3.33	.0417	2.78	.31	2.61	65.46	1.65	.01	82.93	4.03	936.	
2.50	.0185	2.16	.49	2.25	63.93	1.65	.01	75.53	2.37	272.	
1.67	.0185	1.47	.71	1.73	62.15	1.67	.01	67.66	2.25	222.	
.83	.0185	.74	.95	1.01	59.90	1.77	.01	58.81	2.01	161.	



TOTAL TRANSPORT IS 392146. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 91013. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC bV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 29
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 19.00 DEGREES (AT 10.M DEPTH)
REFR COEF .70 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .43% OF THE YEAR

REFRACTED WAVEHEIGHT 4.03 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	4.71	.11	2.47	73.44	1.87	.01	132.24	-.02	-1.	IV
											IS
9.17	.0186	4.70	.12	2.60	72.78	1.84	.01	127.46	.05	1.	IV
											IS
8.33	.0186	4.66	.12	2.72	72.05	1.80	.01	122.35	.19	5.	IVV
											IS
7.50	.0186	4.56	.12	2.83	71.24	1.77	.01	116.84	.43	12.	IVVVVVV
											ISS
6.67	.0106	4.39	.12	2.91	70.33	1.74	.01	110.86	.46	14.	IVVVVVV
											ISS
5.83	.0106	4.13	.11	2.96	69.29	1.71	.01	104.33	.73	23.	IVVVVVVVVVVV
											ISSSSS
5.00	.0417	3.78	.09	2.95	68.09	1.68	.01	97.15	3.01	157.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0417	3.33	.19	2.83	66.86	1.66	.01	90.29	3.40	200.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0417	2.79	.33	2.60	65.52	1.65	.01	83.22	3.56	211.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	2.16	.52	2.24	64.01	1.65	.01	75.90	2.06	68.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSS
1.67	.0185	1.47	.75	1.72	62.26	1.68	.01	68.13	1.96	56.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSS
.83	.0185	.74	.99	1.00	60.06	1.78	.01	59.40	1.78	40.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 101808. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 22475. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 30
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 28.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.01 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .29% OF THE YEAR
****

REFRACTED WAVEHEIGHT 4.04 M
BREAKERANGLE 12. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	3.34	.06	1.81	73.41	1.91	.01	156.85	.01	0.	IV
											IS
9.17	.0186	3.40	.07	1.94	72.74	1.88	.01	150.91	.16	2.	IVV
											IS
8.33	.0186	3.46	.08	2.07	72.01	1.84	.01	144.63	.42	6.	IVVVVV
											IS
7.50	.0186	3.50	.09	2.22	71.21	1.80	.01	137.94	.81	13.	IVVVVVVVVVV
											ISS
6.67	.0186	3.50	.10	2.38	70.31	1.76	.01	130.79	.80	13.	IVVVVVVVVVV
											ISSS
5.83	.0186	3.45	.11	2.51	69.29	1.72	.01	123.04	1.17	22.	IVVVVVVVVVVVVVVV
											ISSSSS
5.00	.0417	3.30	.11	2.61	68.11	1.68	.01	114.56	3.95	172.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0417	3.04	.16	2.63	66.81	1.64	.01	105.79	4.36	236.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0417	2.64	.26	2.52	65.36	1.62	.01	96.77	4.44	252.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	2.11	.43	2.23	63.78	1.61	.01	87.74	2.59	66.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSS
1.67	.0185	1.46	.68	1.74	62.04	1.63	.01	78.72	2.41	53.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSS
.83	.0185	.74	.96	1.02	59.95	1.72	.01	69.06	2.16	38.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 95400. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 23918. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 1

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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

****

SEASON NR 31
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 24.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.01 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.05% OF THE YEAR

****

REFRACTED WAVEHEIGHT 4.09 M
BREAKERANGLE 11. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0186	3.39	.06	1.84	73.41	1.91	.01	156.86	.01	1.	IV
											IS
9.17	.0186	3.45	.07	1.96	72.74	1.87	.01	150.92	.15	14.	IVV
											IS
8.33	.0186	3.50	.08	2.10	72.01	1.83	.01	144.64	.39	39.	IVVVVV
											IS
7.50	.0186	3.54	.09	2.25	71.21	1.79	.01	137.96	.75	83.	IVVVVVVVVVV
											ISSS
6.67	.0106	3.54	.10	2.40	70.31	1.75	.01	130.81	.74	88.	IVVVVVVVVVV
											ISSS
5.83	.0106	3.48	.11	2.54	69.29	1.71	.01	123.06	1.08	141.	IVVVVVVVVVVVVVVV
											ISSSSS
5.00	.0417	3.33	.11	2.63	68.12	1.68	.01	114.60	3.72	1040.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0417	3.05	.16	2.64	66.82	1.64	.01	105.87	4.09	1389.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0417	2.65	.27	2.52	65.38	1.62	.01	96.88	4.16	1461.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0185	2.11	.44	2.23	63.81	1.61	.01	87.90	2.40	406.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSS
1.67	.0185	1.46	.70	1.74	62.09	1.63	.01	78.95	2.24	327.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSS
.83	.0185	.74	.98	1.01	60.03	1.73	.01	69.37	2.01	239.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXχXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 604511. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 145636. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC bV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
=================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
               RHO=1027.00                            D90= .001600
             KAPPA=     .38                         DELTA=1.650000
       TEMPERATURE=  15.00                   BREAKERINDEX= .800000
***********************************************************


SEASON NR 32
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION  19.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.04 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .64% OF THE YEAR
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REFRACTED WAVEHEIGHT 4.17 M
BREAKERANGLE  9. DEGREES

   D    ALFA   H    SETUP   U1    C     KSI    R    L        V      S
10.00 .0186  3.44   .07  1.86 73.41  1.90   .01156.87    .04       1. |V
                                                                       |S
 9.17 .0186  3.50   .08  1.99 72.74  1.87   .01150.94    .18       5. |VV
                                                                       |S
 8.33 .0186  3.55   .09  2.13 72.01  1.83   .01144.66    .42      13. |VVVVVV
                                                                       |SS
 7.50 .0186  3.58   .10  2.28 71.21  1.79   .01137.98    .77      27. |VVVVVVVVVVVV
                                                                       |SSSS
 6.67 .0106  3.58   .11  2.43 70.31  1.75   .01130.83    .72      27. |VVVVVVVVVVV
                                                                       |SSSS
 5.83 .0106  3.52   .11  2.56 69.30  1.71   .01123.08   1.02      41. |VVVVVVVVVVVVVVVV
                                                                       |SSSSSSS
 5.00 .0417  3.35   .12  2.65 68.13  1.67   .01114.67   3.47     276. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  3.07   .17  2.65 66.83  1.64   .01105.96   3.76     345. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.65   .28  2.52 65.40  1.62   .01 97.03   3.78     349. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.11   .46  2.23 63.85  1.61   .01 88.13   2.14     104. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSS
 1.67 .0185  1.46   .71  1.73 62.15  1.63   .01 79.27   1.99      84. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSS
  .83 .0185   .74  1.00  1.01 60.12  1.73   .01 69.79   1.81      61. |VVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   174299. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    38088. M3/SEASON (ACC TO BIJKER)
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    HYDRONAMIC BV
    PORT & WATERWAY ENGINEERS
    SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
=========================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
              RHO=1027.00                           D90= .001600
              KAPPA=    .38                       DELTA=1.650000
        TEMPERATURE=  15.00               BREAKERINDEX= .800000
***************************************************************


SEASON NR 33
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION  24.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .70 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .68% OF THE YEAR
***************************************************************


REFRACTED WAVEHEIGHT 4.17 M
BREAKERANGLE 11. DEGREES

  D    ALFA   H    SETUP   U1   C     KSI    R    L        V       S
10.00 .0186  4.93   .13  2.66 73.46  1.80   .01157.31    .04      1. |V
                                                                     |S
 9.17 .0186  4.91   .14  2.79 72.79  1.77   .01151.39    .16      7. |VV
                                                                     |S
 8.33 .0186  4.85   .14  2.90 72.06  1.75   .01145.10    .38     18. |VVVVV
                                                                     |S
 7.50 .0186  4.73   .14  3.00 71.25  1.72   .01138.35    .74     36. |VVVVVVVVVVV
                                                                     |SSSS
 6.67 .0106  4.53   .13  3.06 70.34  1.69   .01131.06    .72     36. |VVVVVVVVVVV
                                                                     |SSSS
 5.83 .0106  4.24   .12  3.09 69.30  1.66   .01123.12   1.06     56. |VVVVVVVVVVVVVVV
                                                                     |SSSSSS
 5.00 .0417  3.86   .12  3.05 68.13  1.64   .01114.66   3.81    426. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  3.38   .22  2.90 66.91  1.62   .01106.48   4.16    527. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.82   .36  2.65 65.58  1.61   .01 98.11   4.24    533. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.18   .56  2.26 64.10  1.61   .01 89.51   2.48    143. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSS
 1.67 .0185  1.48   .79  1.72 62.38  1.64   .01 80.43   2.33    114. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSS
  .83 .0185   .74  1.03  1.00 60.23  1.74   .01 70.27   2.07     83. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   226139. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    55047. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 1
============================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                 KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00                 BREAKERINDEX= .800000
**********************************************************


SEASON NR 34
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION  19.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .69 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .21% OF THE YEAR
**********************************************************


REFRACTED WAVEHEIGHT 4.17 M
BREAKERANGLE  9. DEGREES

   D    ALFA  H    SETUP  U1   C    KSI   R     L      V      S
10.00 .0186  4.98   .13  2.69 73.46  1.80  .01157.33   .02       0. |V
                                                                     |S
 9.17 .0186  4.96   .14  2.81 72.80  1.77  .01151.41   .12       2. |V
                                                                     |S
 8.33 .0186  4.90   .14  2.93 72.07  1.74  .01145.12   .30       4. |VVVV
                                                                     |SS
 7.50 .0186  4.76   .14  3.02 71.26  1.72  .01138.36   .58       9. |VVVVVVVVV
                                                                     |SSSS
 6.67 .0106  4.56   .13  3.08 70.34  1.69  .01131.07   .58       9. |VVVVVVVVV
                                                                     |SSSS
 5.83 .0106  4.26   .12  3.10 69.30  1.66  .01123.13   .87      14. |VVVVVVVVVVVVVV
                                                                     |SSSSSSS
 5.00 .0417  3.87   .12  3.06 68.13  1.64  .01114.66  3.32      95. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0417  3.39   .22  2.91 66.91  1.62  .01106.48  3.65     116. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0417  2.82   .36  2.65 65.58  1.61  .01 98.11  3.74     116. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0185  2.18   .56  2.26 64.10  1.61  .01 89.50  2.16      35. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSS
 1.67 .0185  1.48   .79  1.72 62.38  1.64  .01 80.42  2.04      28. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSS
  .83 .0185   .74  1.03  1.00 60.23  1.74  .01 70.26  1.83      20. |VVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXxXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    56216. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    12802. M3/SEASON (ACC TO BIJKER)
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TOTAL TRANSPORT  1917878.M3/YEAR
NEGAT TRANSPORT        0.M3/YEAR
POSIT TRANSPORT  1917878.M3/YEAR
DOMINANT NEGAT WAVE DIRECTION   0.
DOMINANT POSIT WAVE DIRECTION  10.
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Calculated transport in profile 2

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      HYDRONAMIC BV
      PORT & WATERWAY ENGINEERS
      SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
==========================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                       D90= .001600
                  KAPPA=    .38                    DELTA=1.650000
           TEMPERATURE=  15.00              BREAKERINDEX= .800000
************************************************************


SEASON NR  1
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  28.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .17% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 1.35 M
BREAKERANGLE 10. DEGREES

  D    ALFA   H   SETUP   U1   C    KSI    R    L      V       S
10.00 .0246   .90   .00   .41 73.36  2.87  .01 80.08  -.09    -0. IVV
                                                                  IS
 9.17 .0246   .91   .00   .44 72.68  2.79  .01 77.76  -.09    -0. IVV
                                                                  IS
 8.33 .0246   .93   .00   .48 71.94  2.70  .01 75.19  -.08    -0. IVV
                                                                  IS
 7.50 .0246   .94   .01   .53 71.12  2.61  .01 72.33  -.08    -0. IVV
                                                                  IS
 6.67 .0246   .96   .01   .59 70.20  2.52  .01 69.15  -.07    -0. IVV
                                                                  IS
 5.83 .0075   .99   .01   .66 69.16  2.42  .01 65.57  -.02    -0. IV
                                                                  IS
 5.00 .0075  1.02   .01   .75 67.96  2.32  .01 61.55  -.02    -0. IV
                                                                  IS
 4.17 .0075  1.05   .01   .87 66.55  2.20  .01 56.97  -.02    -0. IV
                                                                  IS
 3.33 .0160  1.11   .02  1.04 64.82  2.06  .01 51.69  -.00    -0. IV
                                                                  IS
 2.50 .0667  1.16   .03  1.27 62.62  1.92  .01 45.47   .71     5. IVVVVVVVVVVVVVVVVVVVVV
                                                                  ISSSSSSSSSS
 1.67 .0667  1.10   .04  1.50 59.53  1.77  .01 37.77  1.97    23. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .70   .14  1.29 55.20  1.69  .01 28.94  2.13    27. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS      2938. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS       672. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 2
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 17.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 18.53% OF THE YEAR

REFRACTED WAVEHEIGHT 1.36 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	01	C	KSI	R	L	V	S	
10.00	.0246	.93	.00	.42	73.36	2.84	.01	80.08	-.06	-1.	
9.17	.0246	.95	.00	.46	72.68	2.76	.01	77.76	-.06	-2.	
8.33	.0246	.96	.01	.50	71.94	2.68	.01	75.19	-.06	-3.	
7.50	.0246	.98	.01	.55	71.12	2.59	.01	72.33	-.05	-4.	
6.67	.0246	1.00	.01	.61	70.20	2.50	.01	69.15	-.05	-6.	
5.83	.0075	1.02	.01	.68	69.16	2.40	.01	65.58	-.01	-2.	
5.00	.0075	1.05	.01	.77	67.96	2.30	.01	61.55	-.01	-3.	
4.17	.0075	1.09	.02	.90	66.55	2.18	.01	56.98	-.01	-4.	
3.33	.0160	1.14	.02	1.07	64.83	2.05	.01	51.70	.00	1.	
2.50	.0667	1.19	.03	1.31	62.63	1.90	.01	45.49	.56	416.	
1.67	.0667	1.12	.04	1.53	59.54	1.76	.01	37.79	1.53	1726.	
.83	.0667	.70	.15	1.29	55.22	1.69	.01	28.98	1.63	1930.	

TOTAL TRANSPORT IS 22122. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 49498. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
======================================================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                  KAPPA=    .38                      DELTA=1.650000
           TEMPERATURE=  15.00               BREAKERINDEX= .800000
***************************************************************


SEASON NR  3
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION   6.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING      .77% OF THE YEAR
***************************************************************


REFRACTED WAVEHEIGHT 1.38 M
BREAKERANGLE  2. DEGREES

  D    ALFA    H   SETUP   U1    C     KSI     R    L       V        S
10.00 .0246   .95   .00   .43 73.36  2.83    .01 80.08  -.02      -0. |V
                                                                        |S
 9.17 .0246   .96   .00   .47 72.68  2.75    .01 77.76  -.02      -0. |V
                                                                        |S
 8.33 .0246   .98   .01   .51 71.94  2.67    .01 75.19  -.02      -0. |V
                                                                        |S
 7.50 .0246   .99   .01   .56 71.12  2.58    .01 72.33  -.02      -0. |V
                                                                        |S
 6.67 .0246  1.01   .01   .62 70.20  2.49    .01 69.15  -.02      -0. |V
                                                                        |S
 5.83 .0075  1.04   .01   .69 69.16  2.40    .01 65.58  -.01      -0. |V
                                                                        |S
 5.00 .0075  1.07   .01   .79 67.96  2.29    .01 61.56  -.00      -0. |V
                                                                        |S
 4.17 .0075  1.11   .02   .91 66.55  2.17    .01 56.98  -.00      -0. |V
                                                                        |S
 3.33 .0160  1.16   .02  1.09 64.83  2.04    .01 51.70   .00       0. |V
                                                                        |S
 2.50 .0667  1.21   .03  1.33 62.63  1.90    .01 45.49   .24       7. |VVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSS
 1.67 .0667  1.12   .04  1.54 59.55  1.76    .01 37.81   .71      27. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .71   .15  1.29 55.26  1.69    .01 29.05   .80      29. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS      3509. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS       771. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 4
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION -5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .51% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.39 M
BREAKERANGLE -2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.95	.00	.43	73.36	2.83	.01	80.08	.02	0.	V
											S
9.17	.0246	.96	.00	.47	72.68	2.75	.01	77.76	.02	0.	V
											S
8.33	.0246	.98	.01	.51	71.94	2.67	.01	75.19	.02	0.	V
											S
7.50	.0246	.99	.01	.56	71.12	2.58	.01	72.33	.02	0.	V
											S
6.67	.0246	1.01	.01	.62	70.20	2.49	.01	69.15	.01	0.	V
											S
5.83	.0075	1.04	.01	.69	69.16	2.40	.01	65.58	.00	0.	V
											S
5.00	.0075	1.07	.01	.79	67.96	2.29	.01	61.56	.00	0.	V
											S
4.17	.0075	1.11	.02	.91	66.55	2.17	.01	56.98	.00	0.	V
											S
3.33	.0160	1.16	.02	1.09	64.83	2.04	.01	51.70	-.00	-0.	V
											S
2.50	.0667	1.21	.03	1.33	62.63	1.90	.01	45.49	-.20	-4.	VVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSS
1.67	.0667	1.13	.04	1.54	59.55	1.76	.01	37.81	-.61	-15.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.71	.15	1.29	55.26	1.69	.01	29.05	-.69	-16.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS -1941. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -427. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 5
WAVEHEIGHT : 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION -18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .24% OF THE YEAR

REFRACTED WAVEHEIGHT 1.36 M
BREAKERANGLE -7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.93	.00	.42	73.36	2.84	.01	80.08	.06	0.	
9.17	.0246	.94	.00	.46	72.68	2.76	.01	77.76	.06	0.	
8.33	.0246	.96	.01	.50	71.94	2.68	.01	75.19	.06	0.	
7.50	.0246	.97	.01	.55	71.12	2.60	.01	72.33	.05	0.	
6.67	.0246	.99	.01	.61	70.20	2.50	.01	69.15	.05	0.	
5.83	.0075	1.02	.01	.68	69.16	2.41	.01	65.58	.01	0.	
5.00	.0075	1.05	.01	.77	67.96	2.30	.01	61.55	.01	0.	
4.17	.0075	1.09	.02	.90	66.55	2.18	.01	56.97	.01	0.	
3.33	.0160	1.14	.02	1.07	64.83	2.05	.01	51.70	-.00	-0.	
2.50	.0667	1.19	.03	1.31	62.63	1.91	.01	45.48	-.59	-6.	
1.67	.0667	1.11	.04	1.52	59.54	1.76	.01	37.79	-1.58	-23.	
.83	.0667	.70	.15	1.29	55.22	1.68	.01	28.97	-1.69	-26.	

TOTAL TRANSPORT IS -3092. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -673. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
=============================================================================================

PHYSICAL CONSTANTS   G=   9.81      COASTAL CONSTANTS D50= .000950
                   RHO=1027.00                        D90= .001600
                 KAPPA=    .38                      DELTA=1.650000
           TEMPERATURE=  15.00               BREAKERINDEX= .800000
*****************************************************************


SEASON NR  6
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  16.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.01 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .69% OF THE YEAR
*****************************************************************


REFRACTED WAVEHEIGHT 3.33 M
BREAKERANGLE  9. DEGREES

   D    ALFA   H   SETUP  U1   C    KSI    R    L     V        S
10.00 .0246  2.82   .03  1.27 73.38  2.25  .01 80.16 -.18     -4. |VV
                                                                  |S
 9.17 .0246  2.85   .04  1.38 72.71  2.19  .01 77.86 -.13     -3. |VV
                                                                  |S
 8.33 .0246  2.88   .04  1.49 71.97  2.14  .01 75.32 -.05     -1. |V
                                                                  |S
 7.50 .0246  2.91   .05  1.63 71.16  2.08  .01 72.50  .10      3. |V
                                                                  |S
 6.67 .0246  2.94   .06  1.78 70.26  2.02  .01 69.36  .36     12. |VVVVV
                                                                  |SS
 5.83 .0075  2.93   .07  1.94 69.23  1.96  .01 65.83  .23      8. |VVV
                                                                  |S
 5.00 .0075  2.87   .07  2.10 68.05  1.90  .01 61.85  .39     15. |VVVVVV
                                                                  |SS
 4.17 .0075  2.71   .06  2.22 66.64  1.84  .01 57.26  .56     23. |VVVVVVVVV
                                                                  |SSSS
 3.33 .0160  2.43   .15  2.23 65.11  1.80  .01 52.55 1.29     60. |VVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSS
 2.50 .0667  2.00   .29  2.08 63.40  1.77  .01 47.59 3.60    331. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.42   .51  1.71 61.44  1.78  .01 42.38 3.38    265. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .76  1.05 59.03  1.88  .01 36.63 2.93    176. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   106131. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    17600. M3/SEASON (ACC TO BIJKER)
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      HYDRONAMIC BV
      PORT & WATERWAY ENGINEERS
      SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
============================================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00              BREAKERINDEX= .800000
**********************************************************


SEASON NR  7
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION   6.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.01 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .21% OF THE YEAR
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REFRACTED WAVEHEIGHT 3.37 M
BREAKERANGLE   3. DEGREES

  D     ALFA    H    SETUP   U1    C      KSI    R     L      V      S
10.00  .0246  2.85   .03   1.29  73.38   2.24   .01  80.16  -.07       -0. |VV
                                                                            |S
 9.17  .0246  2.88   .04   1.39  72.71   2.19   .01  77.86  -.05       -0. |V
                                                                            |S
 8.33  .0246  2.91   .05   1.51  71.98   2.13   .01  75.32  -.02       -0. |V
                                                                            |S
 7.50  .0246  2.95   .05   1.65  71.16   2.07   .01  72.50   .04        0. |V
                                                                            |S
 6.67  .0246  2.97   .06   1.80  70.26   2.02   .01  69.36   .15        1. |VVVV
                                                                            |SS
 5.83  .0075  2.96   .07   1.96  69.24   1.96   .01  65.84   .10        1. |VV
                                                                            |SS
 5.00  .0075  2.89   .07   2.11  68.05   1.90   .01  61.85   .16        2. |VVVV
                                                                            |SSS
 4.17  .0075  2.73   .07   2.23  66.65   1.84   .01  57.29   .23        3. |VVVVVV
                                                                            |SSSSS
 3.33  .0160  2.44   .15   2.23  65.13   1.80   .01  52.59   .57        7. |VVVVVVVVVVVVVVVV
                                                                            |SSSSSSSSSSSSS
 2.50  .0667  2.00   .30   2.08  63.42   1.77   .01  47.65  1.96       31. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                            |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67  .0667  1.43   .52   1.70  61.47   1.78   .01  42.47  1.87       27. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                            |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83  .0667   .74   .77   1.04  59.08   1.88   .01  36.75  1.70       20. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                            |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 TOTAL TRANSPORT IS     12673. M3/SEASON (ACC TO CERC)
 TOTAL TRANSPORT IS      1960. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 8
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 22.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.25% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.60 M
BREAKERANGLE 7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.99	.00	.50	73.36	2.60	.01	106.30	-.07	-0.	IV IS
9.17	.0246	1.01	.01	.53	72.68	2.54	.01	102.66	-.07	-0.	IV IS
8.33	.0246	1.02	.01	.58	71.94	2.47	.01	98.74	-.06	-1.	IV IS
7.50	.0246	1.05	.01	.63	71.12	2.40	.01	94.48	-.06	-1.	IV IS
6.67	.0246	1.07	.01	.70	70.20	2.32	.01	89.85	-.06	-1.	IV IS
5.83	.0075	1.10	.01	.78	69.16	2.23	.01	84.78	-.02	-0.	IV IS
5.00	.0075	1.14	.01	.88	67.97	2.14	.01	79.18	-.01	-0.	IV IS
4.17	.0075	1.19	.02	1.01	66.56	2.04	.01	72.94	-.00	-0.	IV IS
3.33	.0160	1.25	.03	1.20	64.84	1.92	.01	65.88	.09	6.	IVV IS
2.50	.0667	1.29	.04	1.44	62.65	1.80	.01	57.72	1.42	167.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.17	.05	1.61	59.62	1.68	.01	47.91	2.25	382.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.71	.19	1.29	55.58	1.63	.01	37.24	2.06	335.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 45931. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 11153. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 9
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 23.34% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.64 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.01	.01	.51	73.36	2.59	.01	106.30	-.04	-2.	IV IS
9.17	.0246	1.03	.01	.55	72.68	2.52	.01	102.66	-.04	-3.	IV IS
8.33	.0246	1.05	.01	.59	71.94	2.45	.01	98.74	-.03	-3.	IV IS
7.50	.0246	1.07	.01	.65	71.12	2.38	.01	94.49	-.03	-5.	IV IS
6.67	.0246	1.10	.01	.71	70.20	2.30	.01	89.85	-.03	-6.	IV IS
5.83	.0075	1.13	.01	.80	69.16	2.22	.01	84.78	-.01	-2.	IV IS
5.00	.0075	1.17	.02	.90	67.97	2.13	.01	79.19	-.01	-3.	IV IS
4.17	.0075	1.22	.02	1.04	66.56	2.03	.01	72.95	-.00	-1.	IV IS
3.33	.0160	1.28	.03	1.23	64.84	1.91	.01	65.90	.06	40.	IVV IS
2.50	.0667	1.31	.04	1.47	62.65	1.79	.01	57.74	.92	993.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.06	1.63	59.63	1.67	.01	47.95	1.49	2115.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.20	1.29	55.64	1.63	.01	37.39	1.38	1811.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 256937. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 62298. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
================================================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00                BREAKERINDEX= .800000
************************************************************


SEASON NR 10
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION   3.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   7.26% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 1.65 M
BREAKERANGLE  1. DEGREES

  D    ALFA   H    SETUP   U1   C     KSI    R    L       V         S
10.00 .0246  1.02   .01   .51 73.36  2.58   .01106.30  -.01        -0. |V
                                                                       |S
 9.17 .0246  1.04   .01   .55 72.68  2.52   .01102.66  -.01        -0. |V
                                                                       |S
 8.33 .0246  1.06   .01   .60 71.94  2.45   .01 98.74  -.01        -0. |V
                                                                       |S
 7.50 .0246  1.08   .01   .65 71.12  2.38   .01 94.49  -.01        -0. |V
                                                                       |S
 6.67 .0246  1.11   .01   .72 70.20  2.30   .01 89.86  -.01        -1. |V
                                                                       |S
 5.83 .0075  1.14   .01   .80 69.16  2.22   .01 84.78  -.00        -0. |V
                                                                       |S
 5.00 .0075  1.18   .02   .91 67.97  2.13   .01 79.19  -.00        -0. |V
                                                                       |S
 4.17 .0075  1.23   .02  1.05 66.56  2.03   .01 72.95  -.00        -0. |V
                                                                       |S
 3.33 .0160  1.29   .03  1.24 64.84  1.91   .01 65.90   .02         4. |V
                                                                       |S
 2.50 .0667  1.32   .04  1.48 62.66  1.79   .01 57.74   .30        89. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.18   .06  1.63 59.63  1.67   .01 47.96   .53       188. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .20  1.28 55.66. 1.63   .01 37.43   .52       151. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     22304, M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      5422, M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 11
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .64% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.65 M
BREAKERANGLE -2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.02	.01	.51	73.36	2.58	.01	106.30	.02	0.	V S
9.17	.0246	1.04	.01	.55	72.68	2.52	.01	102.66	.02	0.	V S
8.33	.0246	1.06	.01	.60	71.94	2.45	.01	98.74	.02	0.	V S
7.50	.0246	1.08	.01	.65	71.12	2.38	.01	94.49	.02	0.	V S
6.67	.0246	1.11	.01	.72	70.20	2.30	.01	89.86	.01	0.	V S
5.83	.0075	1.14	.01	.80	69.16	2.22	.01	84.78	.00	0.	V S
5.00	.0075	1.18	.02	.91	67.97	2.13	.01	79.19	.00	0.	V S
4.17	.0075	1.23	.02	1.05	66.56	2.03	.01	72.95	.00	0.	V S
3.33	.0160	1.29	.03	1.24	64.84	1.91	.01	65.90	-.03	-1.	V S
2.50	.0667	1.32	.04	1.48	62.66	1.79	.01	57.74	-.48	-13.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.06	1.63	59.63	1.67	.01	47.96	-.83	-27.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.20	1.28	55.66	1.63	.01	37.42	-.79	-22.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS -3266. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -793. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 12
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -17.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .30% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.62 M
BREAKERANGLE -6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.00	.01	.50	73.36	2.59	.01	106.30	.06	0.	IV IS
9.17	.0246	1.02	.01	.54	72.68	2.53	.01	102.66	.05	0.	IV IS
8.33	.0246	1.04	.01	.59	71.94	2.46	.01	98.74	.05	0.	IV IS
7.50	.0246	1.06	.01	.64	71.12	2.39	.01	94.48	.05	0.	IV IS
6.67	.0246	1.09	.01	.71	70.20	2.31	.01	89.85	.04	0.	IV IS
5.83	.0075	1.12	.01	.79	69.16	2.23	.01	84.78	.01	0.	IV IS
5.00	.0075	1.16	.02	.89	67.97	2.13	.01	79.18	.01	0.	IV IS
4.17	.0075	1.20	.02	1.03	66.56	2.03	.01	72.94	.00	0.	IV IS
3.33	.0160	1.26	.03	1.22	64.84	1.92	.01	65.89	-.08	-1.	IVV IS
2.50	.0667	1.30	.04	1.46	62.65	1.79	.01	57.73	-1.23	-19.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.06	1.62	59.62	1.67	.01	47.93	-1.96	-41.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.71	.20	1.29	55.61	1.63	.01	37.32	-1.79	-35.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS -4930. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1194. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
==

PHYSICAL CONSTANTS G= 9.81   COASTAL CONSTANTS D50= .000950
RHO=1027.00   D90= .001600
KAPPA= .38   DELTA=1.650000
TEMPERATURE= 15.00   BREAKERINDEX= .800000

****

SEASON NR 13
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 22.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR

****

REFRACTED WAVEHEIGHT 3.88 M
BREAKERANGLE 11. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	2.98	.04	1.49	73.39	2.09	.01	106.46	-.11	-3.	IV IS
9.17	.0246	3.03	.05	1.60	72.72	2.05	.01	102.87	.05	1.	IV IS
8.33	.0246	3.07	.06	1.73	71.99	2.00	.01	98.99	.31	9.	IVVV IS
7.50	.0246	3.12	.07	1.87	71.18	1.95	.01	94.80	.71	24.	IVVVVVVVV IS
6.67	.0246	3.14	.08	2.03	70.28	1.90	.01	90.24	1.22	47.	IVVVVVVVVVVVVVVV ISSS
5.83	.0075	3.13	.08	2.19	69.26	1.85	.01	85.23	.64	25.	IVVVVVVVV IS
5.00	.0075	3.05	.08	2.32	68.07	1.80	.01	79.67	.85	36.	IVVVVVVVVVV ISS
4.17	.0075	2.85	.13	2.40	66.76	1.76	.01	73.81	1.01	45.	IVVVVVVVVVVVV ISSS
3.33	.0160	2.52	.23	2.35	65.30	1.72	.01	67.72	1.97	106.	IVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSS
2.50	.0667	2.05	.40	2.14	63.70	1.71	.01	61.51	4.77	746.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.44	.64	1.70	61.92	1.72	.01	55.19	4.37	528.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.92	1.01	59.76	1.83	.01	48.34	3.76	314.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 188998. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 38692. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
==========================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                       D90= .001600
                KAPPA=    .38                     DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
*************************************************************

SEASON NR 14
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  11.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   7.35% OF THE YEAR
*************************************************************

REFRACTED WAVEHEIGHT 3.97 M
BREAKERANGLE  6. DEGREES

  D    ALFA   H    SETUP  U1   C    KSI   R    L       V        S
10.00 .0246  3.05   .05  1.52 73.39 2.08  .01106.47  -.06     -15. IV
                                                                   IS
 9.17 .0246  3.09   .05  1.64 72.72 2.04  .01102.88   .03       9. IV
                                                                   IS
 8.33 .0246  3.14   .06  1.77 71.99 1.99  .01 99.00   .18      59. IVVV
                                                                   IS
 7.50 .0246  3.18   .07  1.91 71.18 1.94  .01 94.81   .42     150. IVVVVVVV
                                                                   ISSS
 6.67 .0246  3.20   .08  2.07 70.28 1.89  .01 90.25   .75     293. IVVVVVVVVVVVVV
                                                                   ISSSSSS
 5.83 .0075  3.18   .09  2.22 69.26 1.84  .01 85.25   .37     152. IVVVVVV
                                                                   ISSS
 5.00 .0075  3.08   .09  2.35 68.08 1.80  .01 79.69   .50     219. IVVVVVVVV
                                                                   ISSSS
 4.17 .0075  2.88   .14  2.41 66.77 1.75  .01 73.88   .58     270. IVVVVVVVVVV
                                                                   ISSSSS
 3.33 .0160  2.54   .24  2.36 65.33 1.72  .01 67.83  1.22     608. IVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSS
 2.50 .0667  2.06   .42  2.14 63.74 1.71  .01 61.68  3.31    2791. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.45   .67  1.70 61.99 1.73  .01 55.43  3.05    2146. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .94  1.01 59.87 1.84  .01 48.66  2.67    1482. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS  1085674. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   193087. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
=============================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                 KAPPA=    .38                     DELTA=1.650000
           TEMPERATURE=  15.00                BREAKERINDEX= .800000
************************************************************


SEASON NR 15
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION   3.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.35% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 3.99 M
BREAKERANGLE  2. DEGREES

  D    ALFA   H    SETUP  U1    C    KSI    R     L      V       S
10.00 .0246  3.06   .05  1.53 73.39  2.08   .01106.47  -.02     -1. |V
                                                                    |S
 9.17 .0246  3.11   .05  1.65 72.72  2.04   .01102.88   .01      1. |V
                                                                    |S
 8.33 .0246  3.16   .06  1.78 71.99  1.99   .01 99.01   .05      5. |VV
                                                                    |S
 7.50 .0246  3.20   .07  1.92 71.18  1.94   .01 94.82   .13     14. |VVVVV
                                                                    |SSS
 6.67 .0246  3.22   .08  2.08 70.28  1.89   .01 90.26   .23     27. |VVVVVVVVV
                                                                    |SSSSSSS
 5.83 .0075  3.19   .09  2.23 69.26  1.84   .01 85.25   .10     14. |VVVV
                                                                    |SSS
 5.00 .0075  3.09   .09  2.36 68.08  1.79   .01 79.69   .14     20. |VVVVVV
                                                                    |SSSSS
 4.17 .0075  2.89   .14  2.42 66.78  1.75   .01 73.90   .17     24. |VVVVVVV
                                                                    |SSSSSS
 3.33 .0160  2.54   .25  2.36 65.34  1.72   .01 67.87   .38     56. |VVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSS
 2.50 .0667  2.06   .43  2.14 63.76  1.71   .01 61.73  1.37    211. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.45   .67  1.70 62.01  1.73   .01 55.50  1.31    175. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .95  1.00 59.90  1.84   .01 48.76  1.24    123. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    96851. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    16639. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

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PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                  KAPPA=    .38                    DELTA=1.650000
            TEMPERATURE=  15.00               BREAKERINDEX= .800000
****************************************************************


SEASON NR 16
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  -5.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   .21% OF THE YEAR
****************************************************************


REFRACTED WAVEHEIGHT 3.99 M
BREAKERANGLE -3. DEGREES

  D    ALFA   H   SETUP   U1   C    KSI    R    L       V       S
10.00 .0246  3.06  .05  1.53 73.39 2.08  .01106.47   .03      0. |V
                                                                 |S
 9.17 .0246  3.11  .05  1.65 72.72 2.04  .01102.88  -.01     -0. |V
                                                                 |S
 8.33 .0246  3.15  .06  1.77 71.99 1.99  .01 99.01  -.09     -1. |VV
                                                                 |S
 7.50 .0246  3.19  .07  1.92 71.18 1.94  .01 94.82  -.20     -2. |VVVVVV
                                                                 |SSS
 6.67 .0246  3.22  .08  2.07 70.28 1.89  .01 90.26  -.37     -4. |VVVVVVVVVV
                                                                 |SSSSSSS
 5.83 .0075  3.19  .09  2.23 69.26 1.84  .01 85.25  -.17     -2. |VVVVV
                                                                 |SSS
 5.00 .0075  3.09  .09  2.36 68.08 1.79  .01 79.69  -.24     -3. |VVVVVVV
                                                                 |SSSSS
 4.17 .0075  2.88  .14  2.42 66.78 1.75  .01 73.90  -.28     -4. |VVVVVVVV
                                                                 |SSSSSS
 3.33 .0160  2.54  .25  2.36 65.34 1.72  .01 67.86  -.62     -8. |VVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSS
 2.50 .0667  2.06  .42  2.14 63.75 1.71  .01 61.72 -2.00    -31. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.45  .67  1.70 62.00 1.73  .01 55.49 -1.88    -26. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  .95  1.00 59.90 1.84  .01 48.74 -1.72    -19. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   -14379. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    -2477. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

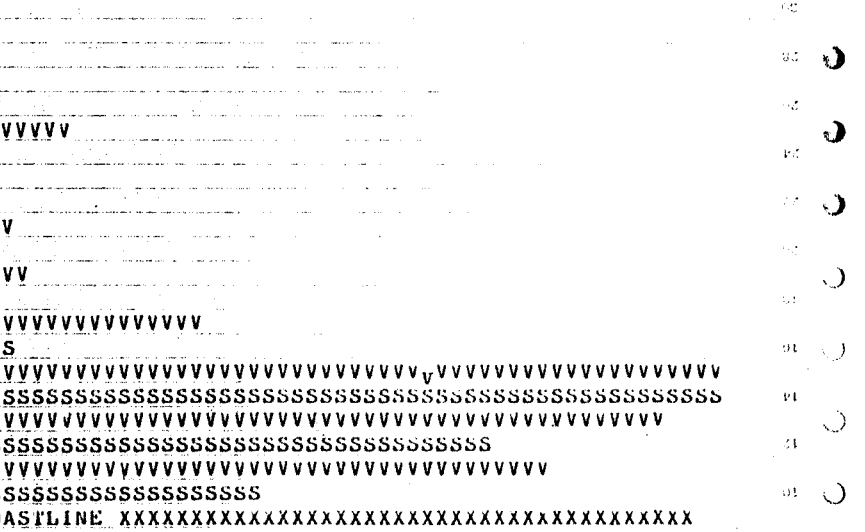
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 17
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -17.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .10% OF THE YEAR

REFRACTED WAVEHEIGHT 3.93 M
BREAKERANGLE -9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.02	.05	1.51	73.39	2.09	.01	106.47	.09	0.	
9.17	.0246	3.06	.05	1.62	72.72	2.04	.01	102.87	-.04	-0.	
8.33	.0246	3.11	.06	1.75	71.99	2.00	.01	99.00	-.27	-1.	
7.50	.0246	3.15	.07	1.89	71.18	1.95	.01	94.81	-.60	-3.	
6.67	.0246	3.18	.08	2.05	70.28	1.90	.01	90.25	-1.04	-6.	
5.83	.0075	3.16	.08	2.20	69.26	1.85	.01	85.24	-.53	-3.	
5.00	.0075	3.07	.09	2.34	68.08	1.80	.01	79.68	-.71	-4.	
4.17	.0075	2.87	.13	2.41	66.77	1.75	.01	73.85	-.84	-5.	
3.33	.0160	2.53	.24	2.36	65.32	1.72	.01	67.78	-1.68	-12.	
2.50	.0667	2.05	.41	2.14	63.72	1.71	.01	61.60	-4.20	-72.	
1.67	.0667	1.44	.66	1.70	61.95	1.73	.01	55.32	-3.85	-52.	
.83	.0667	.74	.93	1.01	59.82	1.83	.01	48.52	-3.34	-33.	



TOTAL TRANSPORT IS -22049. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -4208. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

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PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                         D90= .001600
               KAPPA=    .38                       DELTA=1.650000
         TEMPERATURE=  15.00                BREAKERINDEX= .800000
************************************************************


SEASON NR 18
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  18.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .63% OF THE YEAR
************************************************************



REFRACTED WAVEHEIGHT 1.87 M
BREAKERANGLE  6. DEGREES

  D    ALFA   H    SETUP  U1   C     KSI    R    L      V      S
10.00 .0246  1.07   .01   .57 73.36  2.43  .01131.64  -.06         -0. |V
                                                                       |S
 9.17 .0246  1.09   .01   .61 72.68  2.37  .01126.78  -.05         -0. |V
                                                                       |S
 8.33 .0246  1.12   .01   .66 71.94  2.31  .01121.60  -.05         -0. |V
                                                                       |S
 7.50 .0246  1.14   .01   .72 71.12  2.25  .01116.05  -.05         -0. |V
                                                                       |S
 6.67 .0246  1.17   .01   .79 70.20  2.18  .01110.06  -.04         -0. |V
                                                                       |S
 5.83 .0075  1.21   .01   .87 69.17  2.10  .01103.58  -.01         -0. |V
                                                                       |S
 5.00 .0075  1.25   .02   .99 67.97  2.02  .01 96.50  -.01         -0. |V
                                                                       |S
 4.17 .0075  1.31   .02  1.14 66.56  1.93  .01 88.68   .02          0. |V
                                                                       |S
 3.33 .0160  1.37   .03  1.34 64.85  1.83  .01 79.92   .27          6. |VVVVVV
                                                                       |SS
 2.50 .0667  1.39   .05  1.58 62.67  1.71  .01 69.88  1.94         76. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.22   .07  1.68 59.70  1.61  .01 58.08  2.36        116. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .25  1.27 55.98  1.59  .01 45.96  2.01         87. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     14801. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      3758. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC bV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
=============================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                          D90= .001600
               KAPPA=     .38                       DELTA=1.650000
         TEMPERATURE=  15.00                  BREAKERINDEX= .800000
************************************************************


SEASON NR 19
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION   9.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   6.87% OF THE YEAR
************************************************************



REFRACTED WAVEHEIGHT 1.91 M
BREAKERANGLE  3. DEGREES

  D    ALFA   H   SETUP  U1    C    KSI     R     L      V        S
10.00 .0246  1.09   .01   .58 73.36  2.42   .01131.64  -.03      -1. IV
                                                                     IS
 9.17 .0246  1.11   .01   .62 72.68  2.37   .01126.79  -.03      -1. IV
                                                                     IS
 8.33 .0246  1.14   .01   .67 71.94  2.31   .01121.60  -.03      -1. IV
                                                                     IS
 7.50 .0246  1.16   .01   .73 71.12  2.24   .01116.05  -.02      -1. IV
                                                                     IS
 6.67 .0246  1.19   .01   .80 70.20  2.17   .01110.07  -.02      -2. IV
                                                                     IS
 5.83 .0075  1.23   .01   .89 69.17  2.10   .01103.58  -.01      -1. IV
                                                                     IS
 5.00 .0075  1.27   .02  1.00 67.97  2.01   .01 96.50  -.00      -0. IV
                                                                     IS
 4.17 .0075  1.33   .02  1.15 66.57  1.92   .01 88.68   .01       2. IV
                                                                     IS
 3.33 .0160  1.39   .03  1.36 64.86  1.82   .01 79.93   .15      35. IVVVVV
                                                                     ISSS
 2.50 .0667  1.41   .05  1.60 62.67  1.71   .01 69.89  1.25     446. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.23   .08  1.69 59.71  1.61   .01 58.11  1.54     649. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .25  1.27 56.02  1.59   .01 46.09  1.33     486. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    84851. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    21440. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 20
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.14% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.87 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.10	.01	.58	73.36	2.42	.01	131.64	-.01	-0.	IV
											IS
9.17	.0246	1.12	.01	.62	72.68	2.36	.01	126.79	-.00	-0.	IV
											IS
8.33	.0246	1.14	.01	.67	71.94	2.30	.01	121.60	-.01	-0.	IV
											IS
7.50	.0246	1.17	.01	.73	71.12	2.24	.01	116.05	-.00	-0.	IV
											IS
6.67	.0246	1.20	.01	.80	70.20	2.17	.01	110.07	-.01	-0.	IV
											IS
5.83	.0075	1.24	.02	.89	69.17	2.10	.01	103.58	-.00	-0.	IV
											IS
5.00	.0075	1.28	.02	1.01	67.97	2.01	.01	96.50	-.00	-0.	IV
											IS
4.17	.0075	1.34	.03	1.16	66.57	1.92	.01	88.69	.00	0.	IV
											IS
3.33	.0160	1.40	.03	1.37	64.86	1.82	.01	79.94	.03	2.	IVVVV
											ISSS
2.50	.0667	1.41	.05	1.60	62.68	1.71	.01	69.90	.35	32.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.23	.07	1.70	59.70	1.61	.01	58.08	.45	47.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.25	1.28	55.97	1.59	.01	45.94	.41	32.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 6282. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 1506. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

==

PHYSICAL CONSTANTS	G= 9.81	COASTAL CONSTANTS	D50= .000950
	RHO=1027.00		D90= .001600
	KAPPA= .38		DELTA=1.650000
	TEMPERATURE= 15.00		BREAKERINDEX= .800000

****

SEASON NR 21
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION -5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.23 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .19% OF THE YEAR

****

REFRACTED WAVEHEIGHT 1.88 M
BREAKERANGLE -2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.10	.01	.58	73.36	2.42	.01	131.64	.02	0.	IV IS
9.17	.0246	1.12	.01	.62	72.68	2.36	.01	126.79	.02	0.	IV IS
8.33	.0246	1.14	.01	.67	71.94	2.30	.01	121.60	.01	0.	IV IS
7.50	.0246	1.17	.01	.73	71.12	2.24	.01	116.05	.01	0.	IV IS
6.67	.0246	1.20	.01	.80	70.20	2.17	.01	110.07	.01	0.	IV IS
5.83	.0075	1.24	.02	.89	69.17	2.10	.01	103.58	.00	0.	IV IS
5.00	.0075	1.28	.02	1.01	67.97	2.01	.01	96.50	.00	0.	IV IS
4.17	.0075	1.33	.03	1.16	66.57	1.92	.01	88.69	-.01	-0.	IV IS
3.33	.0160	1.39	.03	1.36	64.86	1.82	.01	79.94	-.09	-1.	IVVVVV ISSS
2.50	.0667	1.41	.05	1.60	62.68	1.71	.01	69.90	-.81	-7.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.23	.07	1.70	59.70	1.61	.01	58.09	-1.01	-10.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.25	1.27	55.99	1.59	.01	45.99	-.87	-7.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS -1411. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -337. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
===========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00               BREAKERINDEX= .800000
************************************************************


SEASON NR 22
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION   18.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.20 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .76% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 4.49 M
BREAKERANGLE  9. DEGREES

  D    ALFA   H   SETUP   U1   C     KSI    R     L       V       S
10.00 .0246  3.23  .06  1.70 73.40  1.98  .01131.92   .19       6. IVV
                                                                   IS
 9.17 .0246  3.28  .06  1.82 72.73  1.94  .01127.13   .48      16. IVVVVVV
                                                                   IS
 8.33 .0246  3.34  .07  1.96 72.00  1.90  .01122.02   .89      33. IVVVVVVVVVVV
                                                                   ISS
 7.50 .0246  3.38  .08  2.10 71.20  1.86  .01116.55  1.37      59. IVVVVVVVVVVVVVVVVVV
                                                                   ISSSS
 6.67 .0246  3.39  .09  2.26 70.30  1.81  .01110.67  1.86      94. IVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSS
 5.83 .0075  3.35  .10  2.40 69.28  1.77  .01104.27   .88      40. IVVVVVVVVVVVV
                                                                   ISSS
 5.00 .0075  3.22  .13  2.51 68.14  1.73  .01 97.46  1.02      51. IVVVVVVVVVVVVVV
                                                                   ISSS
 4.17 .0075  2.98  .19  2.53 66.88  1.69  .01 90.35  1.10      56. IVVVVVVVVVVVVVV
                                                                   ISSSS
 3.33 .0160  2.60  .32  2.43 65.49  1.67  .01 83.10  2.02     120. IVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSS
 2.50 .0667  2.09  .52  2.16 64.01  1.66  .01 75.90  4.72     775. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46  .79  1.68 62.41  1.69  .01 68.75  4.30     531. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74 1.09   .97 60.50  1.80  .01 61.07  3.74     326. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   237465. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    48621. M3/SEASON (ACC TO BIJKER)
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     HYDRONAMIC BV
     PORT & WATERWAY ENGINEERS
     SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
=================================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
              RHO=1027.00                            D90= .001600
             KAPPA=    .38                          DELTA=1.650000
       TEMPERATURE=  15.00                   BREAKERINDEX= .800000
***********************************************************


SEASON NR 23
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION   9.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.10 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   8.23% OF THE YEAR
***********************************************************



REFRACTED WAVEHEIGHT 4.18 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP   U1    C     KSI    R    L       V      S
10.00 .0246  3.28   .06  1.72 73.40  1.98   .01131.93    .01        3. |V
                                                                       |S
 9.17 .0246  3.33   .07  1.85 72.73  1.94   .01127.14    .11       39. |VV
                                                                       |S
 8.33 .0246  3.38   .08  1.98 72.00  1.90   .01122.03    .27      107. |VVVVV
                                                                       |SS
 7.50 .0246  3.42   .09  2.13 71.20  1.85   .01116.57    .52      222. |VVVVVVVVVV
                                                                       |SSSSS
 6.67 .0246  3.43   .09  2.28 70.30  1.81   .01110.68    .83      389. |VVVVVVVVVVVVVVVV
                                                                       |SSSSSSSS
 5.83 .0075  3.38   .10  2.43 69.28  1.77   .01104.28    .38      186. |VVVVVVV
                                                                       |SSSS
 5.00 .0075  3.25   .11  2.53 68.11  1.72   .01 97.31    .49      250. |VVVVVVVVV
                                                                       |SSSSS
 4.17 .0075  3.00   .17  2.56 66.82  1.69   .01 90.08    .55      291. |VVVVVVVVVV
                                                                       |SSSSSS
 3.33 .0160  2.61   .28  2.46 65.40  1.66   .01 82.63   1.13      623. |VVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSS
 2.50 .0667  2.09   .46  2.19 63.85  1.65   .01 75.16   3.08     2639. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .72  1.71 62.16  1.68   .01 67.69   2.83     2015. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.01  1.00 60.13  1.78   .01 59.66   2.49     1422. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS  1135984. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   207417. M3/SEASON (ACC TO BIJKER)
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HYDRODAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

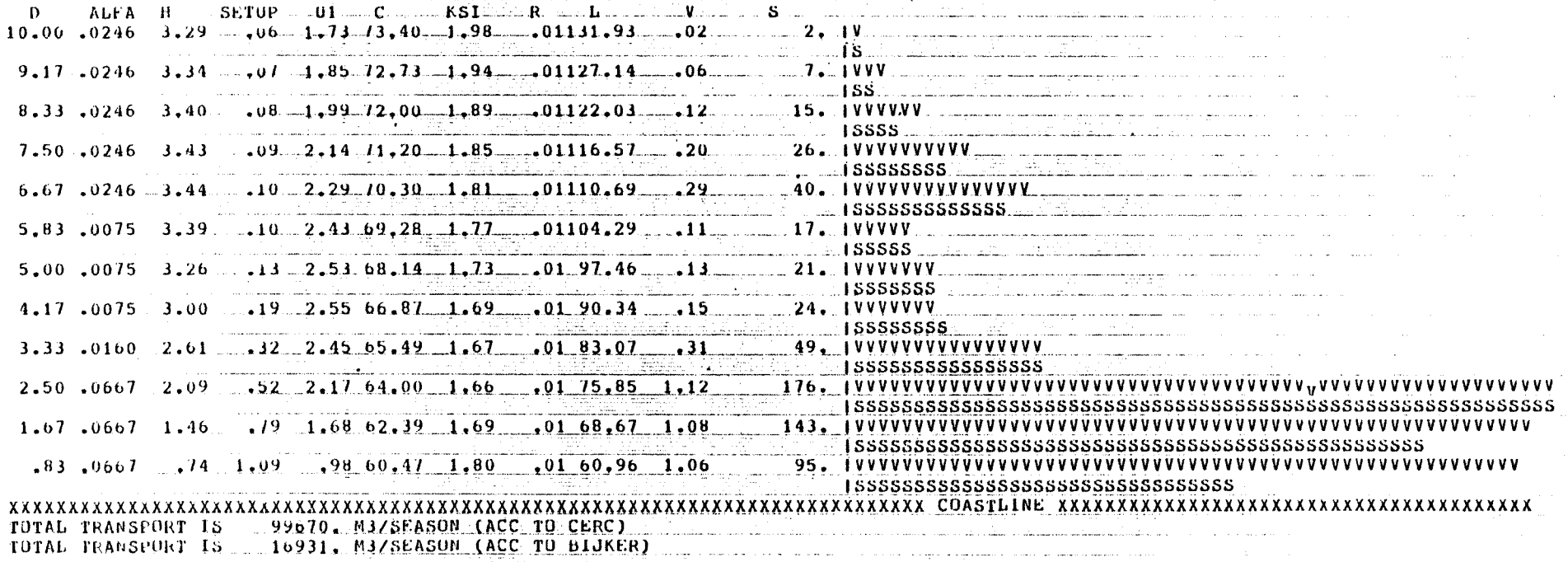
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 24
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.20 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.56% OF THE YEAR

REFRACTED WAVEHEIGHT 4.47 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.29	.06	1.73	73.40	1.98	.01	131.93	.02	2.	
9.17	.0246	3.34	.07	1.85	72.73	1.94	.01	127.14	.06	7.	
8.33	.0246	3.40	.08	1.99	72.00	1.89	.01	122.03	.12	15.	
7.50	.0246	3.43	.09	2.14	71.20	1.85	.01	116.57	.20	26.	
6.67	.0246	3.44	.10	2.29	70.30	1.81	.01	110.69	.29	40.	
5.83	.0075	3.39	.10	2.43	69.28	1.77	.01	104.29	.11	17.	
5.00	.0075	3.26	.13	2.53	68.14	1.73	.01	97.46	.13	21.	
4.17	.0075	3.00	.19	2.55	66.87	1.69	.01	90.34	.15	24.	
3.33	.0160	2.61	.32	2.45	65.49	1.67	.01	83.07	.31	49.	
2.50	.0667	2.09	.52	2.17	64.00	1.66	.01	75.85	1.12	176.	
1.67	.0667	1.46	.79	1.68	62.39	1.69	.01	68.67	1.08	143.	
.83	.0667	.74	1.09	.98	60.47	1.80	.01	60.96	1.06	95.	



TOTAL TRANSPORT IS 99670. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 16931. M3/SEASON (ACC TO BIJKER)

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      HYDRONAMIC BV
      PORT & WATERWAY ENGINEERS
      SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                         D90= .001600
               KAPPA=     .38                      DELTA=1.650000
         TEMPERATURE=  15.00                 BREAKERINDEX= .800000
************************************************************


SEASON NR 25
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  -5.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.21 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .23% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 4.50 M
BREAKERANGLE -3. DEGREES

  D    ALFA   H   SETUP  U1   C    KSI    R    L      V      S
10.00 .0246  3.29  .06  1.73 73.40 1.98  .01131.93  -.06    -1. |V
                                                                |S
 9.17 .0246  3.34  .07  1.85 72.73 1.94  .01127.14  -.16    -2. |VVVV
                                                                |SS
 8.33 .0246  3.39  .08  1.99 72.00 1.89  .01122.03  -.31    -3. |VVVVVVVV
                                                                |SSSSS
 7.50 .0246  3.43  .09  2.14 71.20 1.85  .01116.57  -.50    -6. |VVVVVVVVVVVVV
                                                                |SSSSSSSS
 6.67 .0246  3.41  .10  2.29 70.30 1.81  .01110.69  -.70    -9. |VVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSS
 5.83 .0075  3.39  .10  2.43 69.28 1.77  .01104.29  -.29    -4. |VVVVVVV
                                                                |SSSSS
 5.00 .0075  3.25  .13  2.53 68.14 1.73  .01 97.48  -.34    -5. |VVVVVVVVV
                                                                |SSSSSSS
 4.17 .0075  3.00  .20  2.55 66.88 1.69  .01 90.37  -.36    -5. |VVVVVVVVV
                                                                |SSSSSSS
 3.33 .0160  2.61  .32  2.44 65.50 1.67  .01 83.12  -.74   -11. |VVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSS
 2.50 .0667  2.09  .52  2.17 64.02 1.66  .01 75.92 -2.23   -40. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46  .80  1.68 62.41 1.69  .01 68.78 -2.07   -32. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74 1.10   .97 60.51 1.80  .01 61.10 -1.89   -24. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   -22665. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    -3878. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
===========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=   15.00                BREAKERINDEX= .800000
************************************************************


SEASON NR 26
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION -19.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.20 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .11% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 4.48 M
BREAKERANGLE -9. DEGREES

   D     ALFA   H    SETUP   U1    C    KSI    R    L        V       S
10.00 .0246  3.22   .06  1.70 73.40  1.98   .01131.92  -.19      -1. |VV
                                                                      |S
 9.17 .0246  3.28   .06  1.82 72.73  1.94   .01127.12  -.50      -2. |VVVVVV
                                                                      |S
 8.33 .0246  3.33   .07  1.95 72.00  1.90   .01122.02  -.92      -5. |VVVVVVVVVVV
                                                                      |SS
 7.50 .0246  3.37   .08  2.10 71.20  1.86   .01116.55 -1.41      -9. |VVVVVVVVVVVVVVVVV
                                                                      |SSSS
 6.67 .0246  3.39   .09  2.25 70.30  1.81   .01110.67 -1.92     -14. |VVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSS
 5.83 .0075  3.35   .10  2.40 69.28  1.77   .01104.27  -.91      -6. |VVVVVVVVVVV
                                                                      |SS
 5.00 .0075  3.22   .13  2.51 68.14  1.73   .01 97.45 -1.07      -8. |VVVVVVVVVVVVV
                                                                      |SSS
 4.17 .0075  2.98   .19  2.53 66.87  1.69   .01 90.34 -1.14      -8. |VVVVVVVVVVVVVV
                                                                      |SSSS
 3.33 .0160  2.60   .32  2.43 65.49  1.67   .01 83.09 -2.09     -18. |VVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSS
 2.50 .0667  2.09   .52  2.16 64.01  1.66   .01 75.88 -4.85    -123. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .79  1.68 62.40  1.69   .01 68.71 -4.41     -84. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.09   .97 60.49  1.80   .01 61.02 -3.84     -51. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   -36000. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    -7483. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                 KAPPA=    .38                      DELTA=1.650000
           TEMPERATURE=  15.00               BREAKERINDEX= .800000
************************************************************


SEASON NR 27
 WAVEHEIGHT   4.50 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION   18.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .12% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 4.62 M
BREAKERANGLE  9. DEGREES

   D    ALFA   H    SETUP  U1   C     KSI    R    L       V        S
10.00 .0246  4.72   .11  2.41 73.44  1.87  .01132.24   .24        2. |VV
                                                                     |S
 9.17 .0246  4.71   .12  2.60 72.78  1.83  .01127.46   .51        4. |VVVVVV
                                                                     |S
 8.33 .0246  4.67   .13  2.73 72.05  1.80  .01122.35   .90        7. |VVVVVVVVVVV
                                                                     |SSS
 7.50 .0246  4.57   .13  2.84 71.24  1.77  .01116.84  1.38       12. |VVVVVVVVVVVVVVVV
                                                                     |SSSSS
 6.67 .0246  4.39   .12  2.92 70.33  1.74  .01110.87  1.88       19. |VVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSS
 5.83 .0075  4.13   .11  2.96 69.29  1.71  .01104.33   .85        8. |VVVVVVVVVV
                                                                     |SSS
 5.00 .0075  3.78   .18  2.93 68.21  1.69  .01 97.90   .99        9. |VVVVVVVVVVVV
                                                                     |SSS
 4.17 .0075  3.33   .29  2.80 67.05  1.67  .01 91.32  1.08       10. |VVVVVVVVVVVVV
                                                                     |SSSS
 3.33 .0160  2.79   .46  2.56 65.78  1.66  .01 84.58  2.06       20. |VVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSS
 2.50 .0667  2.16   .67  2.19 64.38  1.67  .01 77.65  4.91      139. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.47   .91  1.66 62.77  1.70  .01 70.32  4.47       94. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.16   .96 60.77  1.82  .01 62.10  3.86       56. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    43085. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     8842. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 28
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 9.00 DEGREES (AT 10.M DEPTH)
REFR COEF .89 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 1.37% OF THE YEAR
****

REFRACTED WAVEHEIGHT 4.85 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	4.78	.12	2.50	73.45	1.86	.011	32.25	.23	18.	IVVV IS
9.17	.0246	4.77	.12	2.63	72.78	1.83	.011	27.48	.43	36.	IVVVVVVV ISSS
8.33	.0246	4.71	.13	2.75	72.05	1.80	.011	22.36	.69	63.	IVVVVVVVVVVV ISSSSSS
7.50	.0246	4.60	.13	2.86	71.24	1.77	.011	16.86	1.00	98.	IVVVVVVVVVVVVVVVVVV ISSSSSSSSSS
6.67	.0246	4.42	.12	2.94	70.33	1.74	.011	10.88	1.32	140.	IVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSS
5.83	.0075	4.16	.13	2.97	69.32	1.71	.011	04.50	.54	54.	IVVVVVVVVV ISSSSS
5.00	.0075	3.80	.21	2.93	68.26	1.69	.01	98.19	.61	61.	IVVVVVVVVVV ISSSSSS
4.17	.0075	3.34	.33	2.79	67.12	1.67	.01	91.71	.65	63.	IVVVVVVVVVVV ISSSSSS
3.33	.0160	2.79	.51	2.54	65.88	1.67	.01	85.09	1.31	127.	IVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSS
2.50	.0667	2.17	.73	2.17	64.52	1.67	.01	78.31	3.46	560.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.47	.98	1.64	62.96	1.71	.01	71.14	3.18	415.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	1.23	.94	61.03	1.83	.01	63.10	2.80	287.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 304699. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 52619. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

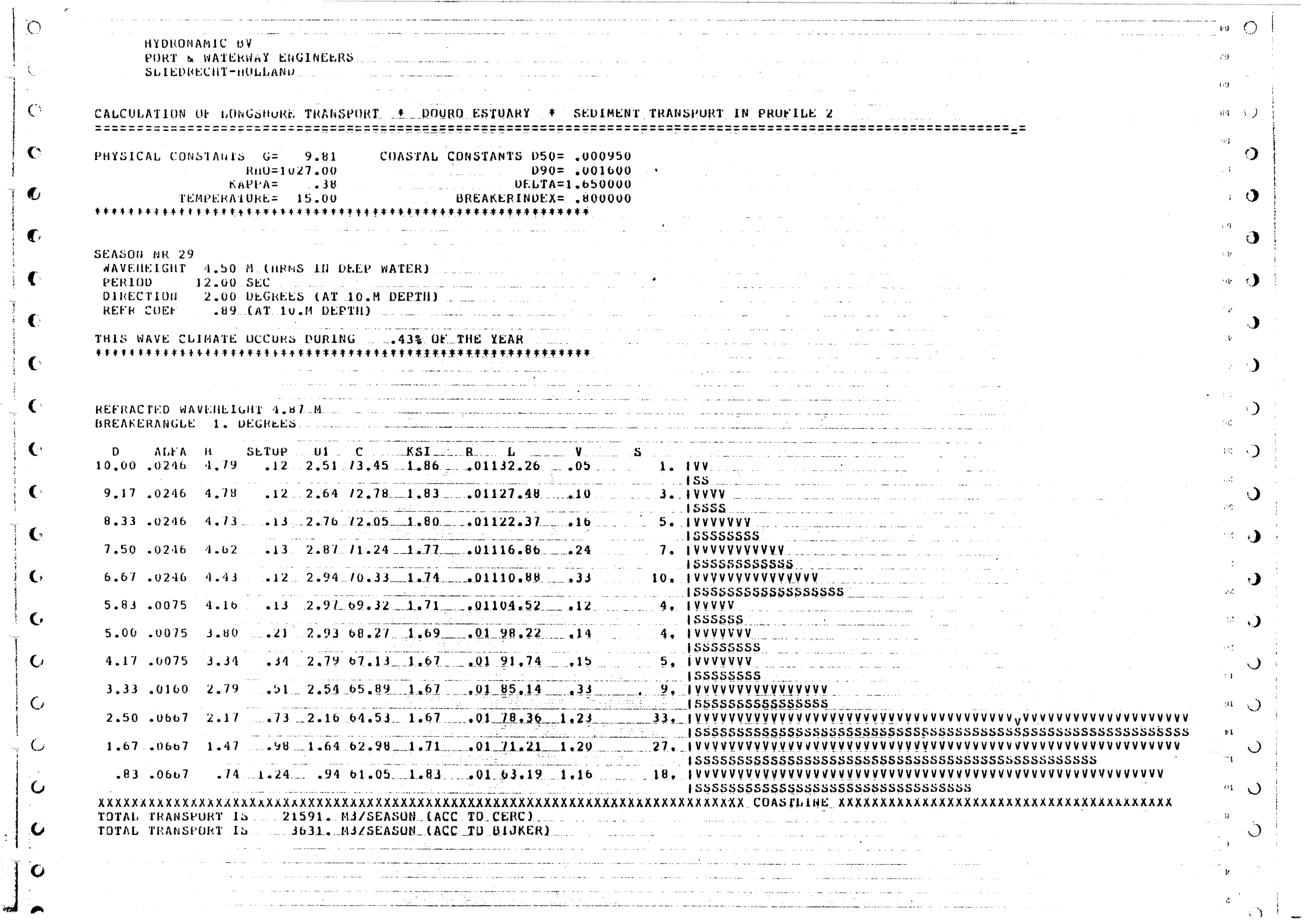
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 29
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF .89 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .43% OF THE YEAR

REFRACTED WAVEHEIGHT 4.87 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	4.79	.12	2.51	73.45	1.86	.01	132.26	.05	1.	
9.17	.0246	4.78	.12	2.64	72.78	1.83	.01	127.48	.10	3.	
8.33	.0246	4.73	.13	2.76	72.05	1.80	.01	122.37	.16	5.	
7.50	.0246	4.62	.13	2.87	71.24	1.77	.01	116.86	.24	7.	
6.67	.0246	4.43	.12	2.94	70.33	1.74	.01	110.88	.33	10.	
5.83	.0075	4.16	.13	2.97	69.32	1.71	.01	104.52	.12	4.	
5.00	.0075	3.80	.21	2.93	68.27	1.69	.01	98.22	.14	4.	
4.17	.0075	3.34	.34	2.79	67.13	1.67	.01	91.74	.15	5.	
3.33	.0160	2.79	.51	2.54	65.89	1.67	.01	85.14	.33	9.	
2.50	.0667	2.17	.73	2.16	64.53	1.67	.01	78.36	1.23	33.	
1.67	.0667	1.47	.98	1.64	62.98	1.71	.01	71.21	1.20	27.	
.83	.0667	.74	1.24	.94	61.05	1.83	.01	63.19	1.16	18.	



TOTAL TRANSPORT IS 21591. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 3631. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                         D90= .001600
               KAPPA=     .38                      DELTA=1.650000
         TEMPERATURE=  15.00                 BREAKERINDEX= .800000
*******************************************************


SEASON NR 30
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION  16.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.28 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .29% OF THE YEAR
*******************************************************


REFRACTED WAVEHEIGHT 5.04 M
BREAKERANGLE  8. DEGREES

  D    ALFA   H    SETUP  U1   C     KSI    R    L        V        S
10.00 .0246  3.46  .07  1.88 73.41  1.90  .01156.88   .63       8. IVVVVVVV
                                                                   IS
 9.17 .0246  3.52  .08  2.00 72.74  1.87  .01150.95  1.04      15. IVVVVVVVVVVVV
                                                                   ISSS
 8.33 .0246  3.57  .09  2.14 72.01  1.83  .01144.67  1.51      25. IVVVVVVVVVVVVVVVVV
                                                                   ISSSSS
 7.50 .0246  3.61  .10  2.29 71.21  1.79  .01137.99  1.98      38. IVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSS
 6.67 .0246  3.60  .11  2.44 70.32  1.75  .01130.84  2.40      54. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSS
 5.83 .0075  3.53  .12  2.57 69.31  1.71  .01123.20  1.07      20. IVVVVVVVVVVVV
                                                                   ISSSS
 5.00 .0075  3.36  .17  2.64 68.20  1.68  .01115.18  1.15      23. IVVVVVVVVVVVVV
                                                                   ISSSS
 4.17 .0075  3.08  .25  2.63 66.98  1.65  .01106.89  1.17      23. IVVVVVVVVVVVVV
                                                                   ISSSS
 3.33 .0160  2.66  .40  2.48 65.66  1.63  .01 98.59  2.07      47. IVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSS
 2.50 .0667  2.11  .63  2.17 64.28  1.63  .01 90.54  4.76     296. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46  .93  1.66 62.83  1.66  .01 82.69  4.33     201. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74 1.25   .94 61.11  1.78  .01 74.29  3.81     127. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   108239. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    21737. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                          D90= .001600
                KAPPA=     .38                       DELTA=1.650000
          TEMPERATURE=  15.00                 BREAKERINDEX= .800000
*************************************************************


SEASON NR 31
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      14.00 SEC
 DIRECTION    9.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.28 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.05% OF THE YEAR
*************************************************************



REFRACTED WAVEHEIGHT 4.97 M
BREAKERANGLE  5. DEGREES

  D    ALFA   H   SETUP   U1    C    KSI    R    L     V      S
10.00 .0246  3.50   .07  1.90 73.41  1.90  .01156.89   .39     35. IVVVVVV
                                                                   ISS
 9.17 .0246  3.56   .08  2.02 72.74  1.86  .01150.96   .66     64. IVVVVVVVVVVV
                                                                   ISSSS
 8.33 .0246  3.61   .09  2.16 72.02  1.82  .01144.68   .98    106. IVVVVVVVVVVVVVVVV
                                                                   ISSSSSSS
 7.50 .0246  3.64   .10  2.31 71.21  1.79  .01138.01  1.31    159. IVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSS
 6.67 .0246  3.63   .11  2.46 70.32  1.75  .01130.85  1.62    220. IVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSS
 5.83 .0075  3.55   .12  2.58 69.31  1.71  .01123.19   .66     84. IVVVVVVVVVVV
                                                                   ISSSSSS
 5.00 .0075  3.38   .16  2.66 68.20  1.67  .01115.15   .72     95. IVVVVVVVVVVVV
                                                                   ISSSSSS
 4.17 .0075  3.09   .24  2.64 66.97  1.65  .01106.82   .73     97. IVVVVVVVVVVVV
                                                                   ISSSSSSS
 3.33 .0160  2.66   .39  2.49 65.64  1.63  .01 98.47  1.37    192. IVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSS
 2.50 .0667  2.12   .62  2.18 64.25  1.63  .01 90.35  3.46    829. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.47   .91  1.66 62.77  1.66  .01 82.42  3.16    612. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.23   .95 61.04  1.78  .01 73.94  2.81    433. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   468834. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    81445. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

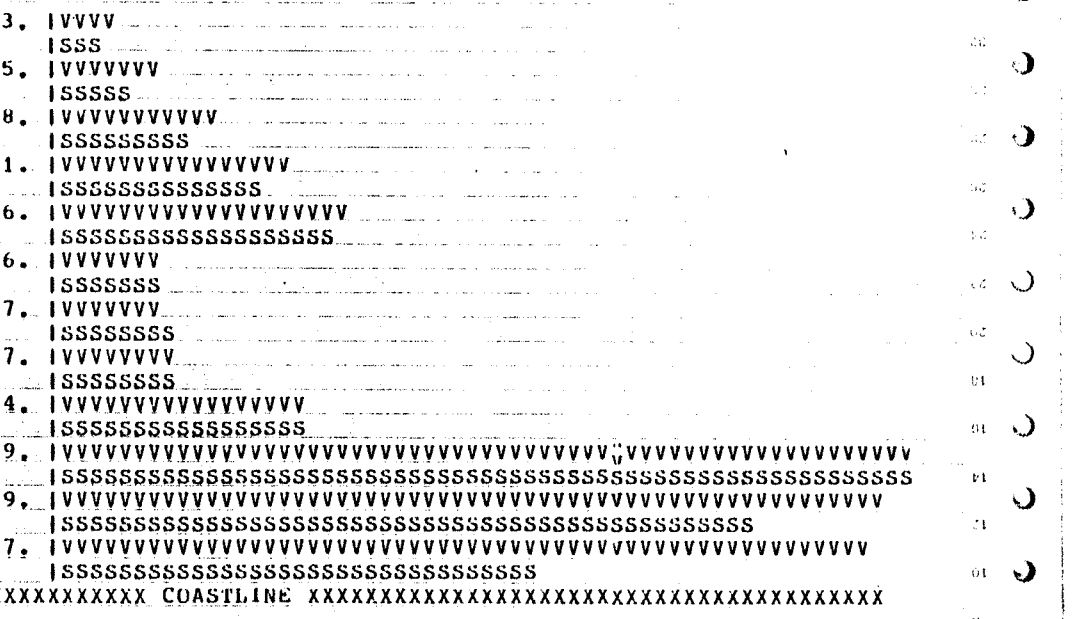
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 32
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.28 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .64% OF THE YEAR

REFRACTED WAVEHEIGHT 5.00 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.51	.07	1.90	73.41	1.90	.01	156.89	.09	3.	
9.17	.0246	3.57	.08	2.03	72.74	1.86	.01	150.96	.16	5.	
8.33	.0246	3.62	.09	2.17	72.02	1.82	.01	144.69	.24	8.	
7.50	.0246	3.65	.10	2.32	71.21	1.78	.01	138.01	.33	11.	
6.67	.0246	3.64	.11	2.47	70.32	1.75	.01	130.86	.43	16.	
5.83	.0075	3.56	.13	2.59	69.31	1.71	.01	123.20	.16	6.	
5.00	.0075	3.39	.17	2.66	68.20	1.67	.01	115.17	.17	7.	
4.17	.0075	3.09	.25	2.64	66.97	1.65	.01	106.85	.17	7.	
3.33	.0160	2.67	.39	2.49	65.65	1.63	.01	98.51	.36	14.	
2.50	.0667	2.12	.62	2.17	64.26	1.63	.01	90.41	1.24	49.	
1.67	.0667	1.47	.92	1.66	62.79	1.66	.01	82.50	1.20	39.	
.83	.0667	.74	1.24	.94	61.06	1.78	.01	74.04	1.17	27.	



TOTAL TRANSPORT IS 33040. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 5604. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DUURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 2
==========================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
              RHO=1027.00                            D90= .001600
             KAPPA=    .38                         DELTA=1.650000
       TEMPERATURE=  15.00                  BREAKERINDEX= .800000
***********************************************************


SEASON NR 33
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION   9.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .82 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .68% OF THE YEAR
***********************************************************



REFRACTED WAVEHEIGHT 4.92 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP   U1    C    KSI    R     L       V      S
10.00 .0246  5.06   .14  2.73 73.46  1.80   .01157.36    .19      8. |VVV
                                                                     |S
 9.17 .0246  5.03   .14  2.85 72.80  1.77   .01151.44    .37.    17. |VVVVVV
                                                                     |SSS
 8.33 .0246  4.95   .15  2.96 72.07  1.74   .01145.14    .63     30. |VVVVVVVVVV
                                                                     |SSSSSS
 7.50 .0246  4.81   .14  3.05 71.26  1.71   .01138.39    .94     48. |VVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSS
 6.67 .0246  4.59   .14  3.10 70.35  1.69   .01131.09   1.28     69. |VVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSS
 5.83 .0075  4.29   .15  3.11 69.34  1.66   .01123.40    .53     27. |VVVVVVVVV
                                                                     |SSSSS
 5.00 .0075  3.89   .22  3.04 68.29  1.64   .01115.78    .61     31. |VVVVVVVVVV
                                                                     |SSSSSS
 4.17 .0075  3.40   .35  2.87 67.15  1.63   .01108.01    .66     31. |VVVVVVVVVVV
                                                                     |SSSSSS
 3.33 .0160  2.83   .52  2.60 65.91  1.62   .01100.13   1.33     63. |VVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSS
 2.50 .0667  2.18   .74  2.20 64.56  1.63   .01 92.09   3.49    281. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.48   .99  1.65 63.01  1.67   .01 83.65   3.21    208. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.25   .94 61.10  1.78   .01 74.21   2.82    144. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    135640. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     26116. M3/SEASON (ACC TO BIJKER)
```

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 2

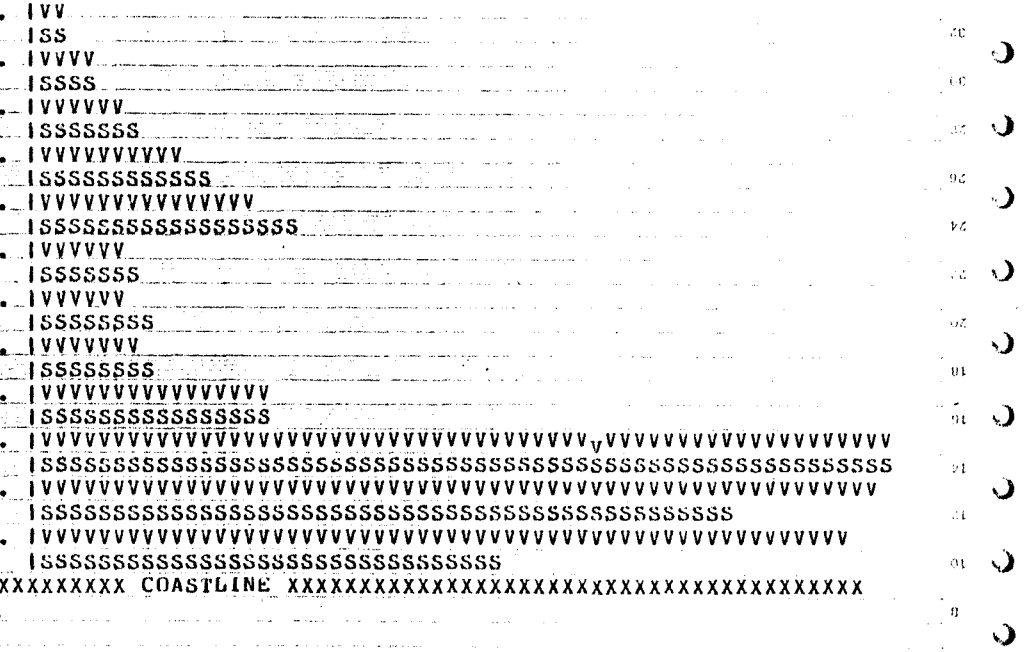
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 34
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF .82 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

REFRACTED WAVEHEIGHT 4.94 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	5.07	.14	2.74	73.46	1.80	.01	157.36	.05	1.	
9.17	.0246	5.04	.14	2.86	72.80	1.77	.01	151.45	.09	1.	
8.33	.0246	4.96	.15	2.97	72.07	1.74	.01	145.15	.14	2.	
7.50	.0246	4.82	.15	3.05	71.26	1.71	.01	138.39	.23	3.	
6.67	.0246	4.60	.14	3.11	70.35	1.69	.01	131.09	.31	5.	
5.83	.0075	4.29	.15	3.11	69.34	1.66	.01	123.43	.13	2.	
5.00	.0075	3.89	.23	3.04	68.29	1.64	.01	115.82	.14	2.	
4.17	.0075	3.40	.35	2.87	67.15	1.63	.01	108.06	.15	2.	
3.33	.0160	2.83	.53	2.60	65.92	1.62	.01	100.19	.34	5.	
2.50	.0667	2.18	.75	2.19	64.57	1.63	.01	92.17	1.25	16.	
1.67	.0667	1.48	1.00	1.65	63.03	1.67	.01	83.74	1.22	13.	
.83	.0667	.74	1.25	.94	61.12	1.78	.01	74.33	1.18	9.	



TOTAL TRANSPORT IS 9457. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 1772. M3/SEASON (ACC TO BIJKER)

TOTAL TRANSPORT 877761.M3/YEAR
NEGAT TRANSPORT -21469.M3/YEAR
POSIT TRANSPORT 899231.M3/YEAR
DOMINANT NEGAT WAVE DIRECTION -6.
DOMINANT POSIT WAVE DIRECTION 5.

Calculated transport in profile 3

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

===

PHYSICAL CONSTANTS G= 9.81 RHO=1027.00 KAPPA= .38 TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950 D90= .001600 DELTA=1.650000 BREAKERINDEX= .800000

****

SEASON NR 1
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .17% OF THE YEAR

****

REFRACTED WAVEHEIGHT 1.49 M
BREAKERANGLE 7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.93	.00	.42	73.36	2.84	.01	80.08	-.08	-0.	IVV IS
9.17	.0246	.94	.00	.46	72.68	2.76	.01	77.76	-.08	-0.	IVV IS
8.33	.0246	.96	.01	.50	71.94	2.68	.01	75.19	-.07	-0.	IVV IS
7.50	.0246	.97	.01	.55	71.12	2.59	.01	72.33	-.07	-0.	IVV IS
6.67	.0246	.99	.01	.61	70.20	2.50	.01	69.15	-.07	-0.	IVV IS
5.83	.0075	1.02	.01	.68	69.16	2.41	.01	65.58	-.02	-0.	IV IS
5.00	.0075	1.05	.01	.77	67.96	2.30	.01	61.55	-.02	-0.	IV IS
4.17	.0075	1.09	.02	.90	66.55	2.18	.01	56.97	-.01	-0.	IV IS
3.33	.0160	1.14	.02	1.07	64.83	2.05	.01	51.70	.04	0.	IV IS
2.50	.0667	1.19	.03	1.31	62.63	1.91	.01	45.48	1.02	8.	IVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSS
1.67	.0667	1.11	.04	1.52	59.57	1.76	.01	37.87	1.88	21.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.70	.17	1.27	55.43	1.70	.01	29.35	1.80	20.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 2926. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 614. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                          D90= .001600
                KAPPA=     .38                       DELTA=1.650000
          TEMPERATURE=  15.00                 BREAKERINDEX= .800000
**************************************************************
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SEASON NR  2
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  15.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.13 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING  18.53% OF THE YEAR
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REFRACTED WAVEHEIGHT 1.51 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.94	.00	.42	73.36	2.84	.01	80.08	-.07	-1.	IVV IS
9.17	.0246	.95	.00	.46	72.68	2.76	.01	77.76	-.06	-2.	IVV IS
8.33	.0246	.96	.01	.50	71.94	2.68	.01	75.19	-.06	-3.	IVV IS
7.50	.0246	.98	.01	.55	71.12	2.59	.01	72.33	-.06	-4.	IVV IS
6.67	.0246	1.00	.01	.61	70.20	2.50	.01	69.15	-.05	-6.	IV IS
5.83	.0075	1.03	.01	.68	69.16	2.40	.01	65.58	-.02	-3.	IV IS
5.00	.0075	1.06	.01	.78	67.96	2.30	.01	61.55	-.01	-3.	IV IS
4.17	.0075	1.10	.02	.90	66.55	2.18	.01	56.98	-.01	-3.	IV IS
3.33	.0160	1.15	.02	1.08	64.83	2.05	.01	51.70	.03	14.	IV IS
2.50	.0667	1.20	.03	1.32	62.63	1.90	.01	45.49	.85	679.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.12	.05	1.53	59.58	1.76	.01	37.88	1.65	1920.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.70	.18	1.27	55.46	1.70	.01	29.41	1.61	1867.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 249241. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 55027. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
==========================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                       D90= .001600
                 KAPPA=    .38                    DELTA=1.650000
           TEMPERATURE=  15.00             BREAKERINDEX= .800000
************************************************************


SEASON NR  3
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  11.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.13 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .77% OF THE YEAR
************************************************************


REFRACTED WAVEHEIGHT 1.53 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP   U1    C    KSI    R    L      V       S
10.00 .0246   .94   .00   .43 73.36  2.83  .01 80.08  -.05     -0. |VV
                                                                   |S
 9.17 .0246   .96   .00   .46 72.68  2.76  .01 77.76  -.05     -0. |VV
                                                                   |S
 8.33 .0246   .97   .01   .50 71.94  2.67  .01 75.19  -.05     -0. |VV
                                                                   |S
 7.50 .0246   .99   .01   .55 71.12  2.59  .01 72.33  -.04     -0. |V
                                                                   |S
 6.67 .0246  1.01   .01   .61 70.20  2.50  .01 69.15  -.04     -0. |V
                                                                   |S
 5.83 .0075  1.03   .01   .69 69.16  2.40  .01 65.58  -.01     -0. |V
                                                                   |S
 5.00 .0075  1.06   .01   .78 67.96  2.29  .01 61.55  -.01     -0. |V
                                                                   |S
 4.17 .0075  1.11   .02   .91 66.55  2.18  .01 56.98  -.01     -0. |V
                                                                   |S
 3.33 .0160  1.16   .02  1.08 64.83  2.05  .01 51.70   .02      0. |V
                                                                   |S
 2.50 .0667  1.20   .03  1.32 62.63  1.90  .01 45.49   .68     22. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.12   .05  1.53 59.58  1.76  .01 37.89  1.35     60. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .70   .18  1.27 55.47  1.70  .01 29.44  1.32     58. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     7760. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     1718. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS G=	9.81	COASTAL CONSTANTS D50=	.000950
RHO=	1027.00	D90=	.001600
KAPPA=	.38	DELTA=	1.650000
TEMPERATURE=	15.00	BREAKERINDEX=	.800000

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SEASON NR 4
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .51% OF THE YEAR
****

REFRACTED WAVEHEIGHT 1.52 M
BREAKERANGLE 2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.95	.00	.43	73.36	2.83	.01	80.08	-.02	-0.	IV
											IS
9.17	.0246	.96	.00	.47	72.68	2.75	.01	77.76	-.02	-0.	IV
											IS
8.33	.0246	.98	.01	.51	71.94	2.67	.01	75.19	-.02	-0.	IV
											IS
7.50	.0246	.99	.01	.56	71.12	2.58	.01	72.33	-.02	-0.	IV
											IS
6.67	.0246	1.01	.01	.62	70.20	2.49	.01	69.15	-.02	-0.	IV
											IS
5.83	.0075	1.04	.01	.69	69.16	2.40	.01	65.58	-.01	-0.	IV
											IS
5.00	.0075	1.07	.01	.79	67.96	2.29	.01	61.56	-.00	-0.	IV
											IS
4.17	.0075	1.11	.02	.91	66.55	2.17	.01	56.98	-.00	-0.	IV
											IS
3.33	.0160	1.16	.02	1.09	64.83	2.04	.01	51.70	.01	0.	IV
											IS
2.50	.0667	1.21	.03	1.33	62.63	1.90	.01	45.49	.33	6.	IVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.13	.05	1.53	59.58	1.76	.01	37.89	.73	18.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.71	.18	1.27	55.47	1.70	.01	29.43	.74	17.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 2340. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 520. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
=============================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                RHO=1027.00                          D90= .001600
              KAPPA=    .38                        DELTA=1.650000
        TEMPERATURE=  15.00                  BREAKERINDEX= .800000
***********************************************************


SEASON NR  5
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION -21.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.13 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .24% OF THE YEAR
***********************************************************



REFRACTED WAVEHEIGHT 1.49 M
BREAKERANGLE -8. DEGREES

   D    ALFA   H    SETUP   U1    C    KSI    R     L      V      S
10.00 .0246   .92   .00   .42 73.36  2.85   .01 80.08   .09          0. |VV
                                                                          |S
 9.17 .0246   .94   .00   .45 72.68  2.77   .01 77.76   .08          0. |VV
                                                                          |S
 8.33 .0246   .95   .00   .49 71.94  2.69   .01 75.19   .08          0. |VV
                                                                          |S
 7.50 .0246   .97   .01   .54 71.12  2.60   .01 72.33   .08          0. |VV
                                                                          |S
 6.67 .0246   .99   .01   .60 70.20  2.51   .01 69.15   .07          0. |VV
                                                                          |S
 5.83 .0075  1.01   .01   .67 69.16  2.41   .01 65.58   .02          0. |V
                                                                          |S
 5.00 .0075  1.04   .01   .77 67.96  2.30   .01 61.55   .02          0. |V
                                                                          |S
 4.17 .0075  1.08   .02   .89 66.55  2.19   .01 56.97   .01          0. |V
                                                                          |S
 3.33 .0160  1.13   .02  1.06 64.83  2.05   .01 51.70  -.03         -0. |V
                                                                          |S
 2.50 .0667  1.18   .03  1.30 62.63  1.91   .01 45.48 -1.04        -11. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                          |SSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.11   .04  1.52 59.57  1.76   .01 37.86 -2.00        -33. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                          |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .70   .17  1.27 55.42  1.70   .01 29.35 -1.95        -33. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                          |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    -4320. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     -953. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 6
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 17.00 DEGREES (AT 10.M DEPTH)
REFR COEF .80 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR
****

REFRACTED WAVEHEIGHT 2.75 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	2.81	.03	1.27	73.38	2.25	.01	80.16	-.14	-3.	VV S
9.17	.0246	2.84	.04	1.37	72.71	2.19	.01	77.86	-.13	-3.	VV S
8.33	.0246	2.87	.04	1.49	71.97	2.14	.01	75.32	-.11	-3.	VV S
7.50	.0246	2.91	.05	1.63	71.16	2.08	.01	72.50	-.08	-2.	V S
6.67	.0246	2.93	.06	1.78	70.26	2.02	.01	69.36	-.01	-0.	V S
5.83	.0075	2.93	.07	1.94	69.23	1.96	.01	65.83	.04	2.	V S
5.00	.0075	2.87	.07	2.09	68.05	1.90	.01	61.84	.14	5.	VV S
4.17	.0075	2.71	.06	2.21	66.64	1.84	.01	57.26	.29	12.	VVVVV SS
3.33	.0160	2.43	.06	2.26	64.92	1.79	.01	51.98	.94	42.	VVVVVVVVVVVVVVVVV SSSSSSSSSS
2.50	.0667	2.00	.18	2.13	63.07	1.76	.01	46.69	3.16	248.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.42	.36	1.77	60.91	1.75	.01	41.05	3.09	224.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.60	1.11	58.17	1.83	.01	34.77	2.69	152.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 64030. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 11407. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

****

SEASON NR 7
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF .80 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

****

REFRACTED WAVEHEIGHT 2.78 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	2.83	.03	1.28	73.38	2.24	.01	80.16	-.09	-1.	VV
											S
9.17	.0246	2.87	.04	1.38	72.71	2.19	.01	77.86	-.09	-1.	VV
											S
8.33	.0246	2.90	.05	1.50	71.98	2.13	.01	75.32	-.08	-1.	V
											S
7.50	.0246	2.93	.05	1.64	71.16	2.08	.01	72.50	-.05	-0.	V
											S
6.67	.0246	2.96	.06	1.79	70.26	2.02	.01	69.36	-.01	-0.	V
											S
5.83	.0075	2.95	.07	1.95	69.24	1.96	.01	65.84	.03	0.	V
											S
5.00	.0075	2.88	.07	2.10	68.05	1.90	.01	61.85	.10	1.	VV
											S
4.17	.0075	2.72	.06	2.22	66.64	1.84	.01	57.26	.20	3.	VVVV
											SSS
3.33	.0160	2.44	.07	2.26	64.93	1.79	.01	52.01	.66	9.	VVVVVVVVVVVVVVVVV
											SSSSSSSSSSS
2.50	.0667	2.00	.19	2.13	63.09	1.76	.01	46.73	2.44	45.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.43	.37	1.77	60.93	1.75	.01	41.11	2.41	42.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.01	1.11	58.21	1.83	.01	34.86	2.13	30.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 13055. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 2221. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

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=========================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
               RHO=1027.00                             D90= .001600
                 KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00                 BREAKERINDEX= .800000
***********************************************************

SEASON NR  8
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  21.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.25% OF THE YEAR
***********************************************************

REFRACTED WAVEHEIGHT 1.76 M
BREAKERANGLE  7. DEGREES

  D    ALFA   H    SETUP   U1    C    KSI    R    L        V       S
10.00 .0246   .99   .00   .50 73.36  2.60  .01106.30  -.09     -0. |VV
                                                                   |S
 9.17 .0246  1.01   .01   .54 72.68  2.54  .01102.66  -.08     -1. |V
                                                                   |S
 8.33 .0246  1.03   .01   .58 71.94  2.47  .01 98.74  -.08     -1. |V
                                                                   |S
 7.50 .0246  1.05   .01   .63 71.12  2.39  .01 94.48  -.07     -1. |V
                                                                   |S
 6.67 .0246  1.08   .01   .70 70.20  2.32  .01 89.85  -.07     -1. |V
                                                                   |S
 5.83 .0075  1.11   .01   .78 69.16  2.23  .01 84.78  -.02     -0. |V
                                                                   |S
 5.00 .0075  1.14   .01   .88 67.97  2.14  .01 79.18  -.01     -0. |V
                                                                   |S
 4.17 .0075  1.19   .02  1.02 66.56  2.04  .01 72.94   .01      0. |V
                                                                   |S
 3.33 .0160  1.25   .03  1.20 64.84  1.92  .01 65.89   .22     15. |VVVVV
                                                                   |SS
 2.50 .0667  1.29   .04  1.45 62.65  1.80  .01 57.72  1.89    257. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.17   .06  1.61 59.66  1.68  .01 48.02  2.46    446. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .71   .22  1.27 55.81  1.64  .01 37.79  2.13    349. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    58904. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    13755. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
===========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                          D90= .001600
                KAPPA=     .38                       DELTA=1.650000
          TEMPERATURE=   15.00                BREAKERINDEX= .800000
***********************************************************


SEASON NR  9
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  12.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING  23.34% OF THE YEAR
***********************************************************


REFFACTED WAVEHEIGHT 1.80 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP  U1   C    KSI    R    L      V       S
10.00 .0246  1.01   .01  .51 73.36  2.59  .01106.30  -.05      -3. |V
                                                                    |S
 9.17 .0246  1.03   .01  .55 72.68  2.52  .01102.66  -.05      -3. |V
                                                                    |S
 8.33 .0246  1.05   .01  .59 71.94  2.46  .01 98.74  -.05      -5. |V
                                                                    |S
 7.50 .0246  1.07   .01  .65 71.12  2.38  .01 94.49  -.04      -6. |V
                                                                    |S
 6.67 .0246  1.10   .01  .71 70.20  2.31  .01 89.85  -.04      -8. |V
                                                                    |S
 5.83 .0075  1.13   .01  .79 69.16  2.22  .01 84.78  -.01      -3. |V
                                                                    |S
 5.00 .0075  1.17   .02  .90 67.97  2.13  .01 79.19  -.01      -3. |V
                                                                    |S
 4.17 .0075  1.22   .02 1.04 66.56  2.03  .01 72.95   .01       4. |V
                                                                    |S
 3.33 .0160  1.28   .03 1.23 64.84  1.91  .01 65.90   .15     106. |VVVV
                                                                    |SS
 2.50 .0667  1.31   .04 1.47 62.65  1.79  .01 57.74  1.37    1676. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.18   .07 1.62 59.67  1.68  .01 48.06  1.78    2728. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .23 1.27 55.87  1.64  .01 37.92  1.55    2139. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   371418. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    86110. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

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SEASON NR 10
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.25 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 7.26% OF THE YEAR

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REFRACTED WAVEHEIGHT 1.78 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.01	.01	.51	73.36	2.59	.01	106.30	-.05	-1.	V S
9.17	.0246	1.03	.01	.55	72.68	2.52	.01	102.66	-.05	-1.	V S
8.33	.0246	1.05	.01	.59	71.94	2.45	.01	98.74	-.04	-1.	V S
7.50	.0246	1.07	.01	.65	71.12	2.38	.01	94.49	-.04	-2.	V S
6.67	.0246	1.10	.01	.71	70.20	2.30	.01	89.85	-.04	-2.	V S
5.83	.0075	1.13	.01	.80	69.16	2.22	.01	84.78	-.01	-1.	V S
5.00	.0075	1.17	.02	.90	67.97	2.13	.01	79.19	-.01	-1.	V S
4.17	.0075	1.22	.02	1.04	66.56	2.03	.01	72.95	.01	1.	V S
3.33	.0160	1.28	.03	1.23	64.84	1.91	.01	65.90	.13	29.	VVVV SS
2.50	.0667	1.31	.04	1.47	62.65	1.79	.01	57.74	1.27	468.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.07	1.62	59.66	1.68	.01	48.05	1.67	773.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.23	1.27	55.85	1.64	.01	37.88	1.46	607.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 104722. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 24257. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

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PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
               RHO=1027.00                          D90= .001600
             KAPPA=    .38                        DELTA=1.650000
       TEMPERATURE=  15.00                 BREAKERINDEX= .800000
**********************************************************


SEASON NR 11
 WAVEHEIGHT   1.00 M (HRMS IN DEEP WATER)
 PERIOD      10.00 SEC
 DIRECTION    2.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.25 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .64% OF THE YEAR
**********************************************************



REFRACTED WAVEHEIGHT 1.80 M
BREAKERANGLE  1. DEGREES

  D    ALFA   H   SETUP   U1    C     KSI    R     L       V       S
10.00 .0246  1.02  .01   .51 73.36  2.58  .01106.30   -.01      -0. |V
                                                                    |S
 9.17 .0246  1.04  .01   .55 72.68  2.52  .01102.66   -.01      -0. |V
                                                                    |S
 8.33 .0246  1.06  .01   .60 71.94  2.45  .01 98.74   -.01      -0. |V
                                                                    |S
 7.50 .0246  1.08  .01   .65 71.12  2.38  .01 94.49   -.01      -0. |V
                                                                    |S
 6.67 .0246  1.11  .01   .72 70.20  2.30  .01 89.86   -.01      -0. |V
                                                                    |S
 5.83 .0075  1.14  .01   .80 69.16  2.22  .01 84.78   -.00      -0. |V
                                                                    |S
 5.00 .0075  1.18  .02   .91 67.97  2.13  .01 79.19   -.00      -0. |V
                                                                    |S
 4.17 .0075  1.23  .02  1.05 66.56  2.03  .01 72.95    .00       0. |V
                                                                    |S
 3.33 .0160  1.29  .03  1.24 64.84  1.91  .01 65.90    .03       1. |VVV
                                                                    |SS
 2.50 .0667  1.32  .04  1.48 62.66  1.79  .01 57.74    .30       8. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.18  .07  1.63 59.67  1.67  .01 48.07    .43      13. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72  .23  1.27 55.87  1.64  .01 37.93    .39       9. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     1720. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      403. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
=============================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                           D90= .001600
                KAPPA=    .38                        DELTA=1.650000
          TEMPERATURE=  15.00                  BREAKERINDEX= .800000
************************************************************

SEASON NR 12
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION -12.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.24 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    30% OF THE YEAR
************************************************************

REFRACTED WAVEHEIGHT 1.77 M
BREAKERANGLE -4. DEGREES

  D    ALFA   H    SETUP   U1   C    KSI    R     L      V      S
10.00 .0246  1.01   .01   .51 73.36  2.59  .01106.30   .05       0. |V
                                                                    |S
 9.17 .0246  1.03   .01   .55 72.68  2.52  .01102.66   .05       0. |V
                                                                    |S
 8.33 .0246  1.05   .01   .59 71.94  2.46  .01 98.74   .05       0. |V
                                                                    |S
 7.50 .0246  1.07   .01   .65 71.12  2.38  .01 94.49   .04       0. |V
                                                                    |S
 6.67 .0246  1.10   .01   .71 70.20  2.31  .01 89.85   .04       0. |V
                                                                    |S
 5.83 .0075  1.13   .01   .79 69.16  2.22  .01 84.78   .01       0. |V
                                                                    |S
 5.00 .0075  1.17   .02   .90 67.97  2.13  .01 79.19   .01       0. |V
                                                                    |S
 4.17 .0075  1.22   .02  1.04 66.56  2.03  .01 72.95  -.00      -0. |V
                                                                    |S
 3.33 .0160  1.28   .03  1.23 64.84  1.91  .01 65.90  -.13      -1. |VVVV
                                                                    |SS
 2.50 .0667  1.31   .04  1.47 62.65  1.79  .01 57.74 -1.32     -20. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.18   .06  1.62 59.66  1.68  .01 48.04 -1.76     -34. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .23  1.27 55.83  1.64  .01 37.82 -1.53     -27. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    -4624. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    -1071. M3/SEASON (ACC TO BIJKER)
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        HYDRONAMIC BV
        PORT & WATERWAY ENGINEERS
        SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
=========================================================================================

PHYSICAL CONSTANTS   G=    9.81      COASTAL CONSTANTS D50= .000950
                   RHO=1027.00                          D90= .001600
                 KAPPA=     .38                        DELTA=1.650000
           TEMPERATURE=   15.00                BREAKERINDEX= .800000
*********************************************************


SEASON NR 13
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      10.00 SEC
 DIRECTION   11.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .79 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .69% OF THE YEAR
*********************************************************



REFRACTED WAVEHEIGHT 2.96 M
BREAKERANGLE  5. DEGREES

  D    ALFA   H   SETUP  U1   C    KSI   R    L      V      S
10.00 .0246  3.04   .05  1.52 73.39  2.08  .01106.47  -.07     -2. |V
                                                                   |S
 9.17 .0246  3.09   .05  1.64 72.72  2.04  .01102.88  -.06     -2. |V
                                                                   |S
 8.33 .0246  3.14   .06  1.76 71.99  1.99  .01 99.00  -.05     -1. |V
                                                                   |S
 7.50 .0246  3.18   .07  1.91 71.18  1.94  .01 94.81  -.02     -1. |V
                                                                   |S
 6.67 .0246  3.20   .08  2.06 70.28  1.89  .01 90.25   .05      2. |V
                                                                   |S
 5.83 .0075  3.18   .09  2.22 69.26  1.84  .01 85.25   .06      2. |V
                                                                   |S
 5.00 .0075  3.08   .09  2.35 68.08  1.80  .01 79.69   .14      6. |VVV
                                                                   |SS
 4.17 .0075  2.88   .08  2.43 66.66  1.75  .01 73.41   .27     12. |VVVVVV
                                                                   |SSSS
 3.33 .0160  2.54   .10  2.42 65.01  1.71  .01 66.56   .78     35. |VVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSS
 2.50 .0667  2.06   .22  2.22 63.20  1.68  .01 59.67  2.65    172. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.45   .42  1.80 61.10  1.68  .01 52.51  2.54    147. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .66  1.10 58.49  1.76  .01 44.67  2.21    103. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    46870. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     8875. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 14
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 12.00 DEGREES (AT 10.M DEPTH)
REFR COEF .77 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 7.35% OF THE YEAR
****

REFRACTED WAVEHEIGHT 2.95 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.04	.05	1.52	73.39	2.09	.01	106.47	-.07	-19.	IV IS
9.17	.0246	3.08	.05	1.63	72.72	2.04	.01	102.87	-.07	-19.	IV IS
8.33	.0246	3.13	.06	1.76	71.99	1.99	.01	99.00	-.05	-17.	IV IS
7.50	.0246	3.17	.07	1.91	71.18	1.94	.01	94.81	-.03	-10.	IV IS
6.67	.0246	3.20	.08	2.06	70.28	1.89	.01	90.25	.03	12.	IV IS
5.83	.0075	3.18	.08	2.22	69.26	1.84	.01	85.25	.05	21.	IV IS
5.00	.0075	3.08	.09	2.35	68.08	1.80	.01	79.69	.14	60.	IVV IS
4.17	.0075	2.88	.08	2.43	66.66	1.75	.01	73.41	.27	122.	IVVVVV ISSS
3.33	.0160	2.54	.10	2.42	65.01	1.71	.01	66.54	.80	387.	IVVVVVVVVVVVVVVVV ISSSSSSSSSS
2.50	.0667	2.06	.22	2.22	63.19	1.68	.01	59.66	2.74	1953.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.45	.41	1.80	61.09	1.68	.01	52.48	2.65	1695.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.65	1.10	58.48	1.76	.01	44.64	2.31	1185.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 490356. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 98161. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

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==============================================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                         D90= .001600
              KAPPA=     .38                       DELTA=1.650000
        TEMPERATURE=   15.00                BREAKERINDEX= .800000
**********************************************************

SEASON NR 15
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      10.00 SEC
 DIRECTION   11.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .83 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.35% OF THE YEAR
**********************************************************

REFRACTED WAVEHEIGHT 3.11 M
BREAKERANGLE  5. DEGREES

  D     ALFA   H     SETUP  U1    C    KSI    R     L      V        S
10.00 .0246  3.04   .05  1.52 73.39  2.08   .01106.47  -.07      -6. |V
                                                                      |S
 9.17 .0246  3.09   .05  1.64 72.72  2.04   .01102.88  -.07      -6. |V
                                                                      |S
 8.33 .0246  3.14   .06  1.76 71.99  1.99   .01 99.00  -.05      -5. |V
                                                                      |S
 7.50 .0246  3.18   .07  1.91 71.18  1.94   .01 94.81  -.00      -0. |V
                                                                      |S
 6.67 .0246  3.20   .08  2.06 70.28  1.89   .01 90.25   .09      11. |V
                                                                      |S
 5.83 .0075  3.18   .09  2.22 69.26  1.84   .01 85.25   .09      11. |V
                                                                      |S
 5.00 .0075  3.08   .09  2.35 68.08  1.80   .01 79.69   .18      26. |VVVV
                                                                      |SS
 4.17 .0075  2.88   .08  2.43 66.66  1.75   .01 73.41   .31      46. |VVVVVV
                                                                      |SSSS
 3.33 .0160  2.54   .12  2.41 65.06  1.71   .01 66.75   .85     131. |VVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSS
 2.50 .0667  2.06   .25  2.21 63.28  1.69   .01 59.98  2.75     625. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.45   .45  1.79 61.24  1.69   .01 52.96  2.62     526. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .70  1.09 58.71  1.77   .01 45.29  2.28     367. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   176203. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    33573. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 16
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 3.00 DEGREES (AT 10.M DEPTH)
REFR COEF .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR
****

REFRACTED WAVEHEIGHT 3.17 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.06	.05	1.53	73.39	2.08	.01	106.47	-.02	-0.	V
											S
9.17	.0246	3.11	.05	1.65	72.72	2.04	.01	102.88	-.02	-0.	V
											S
8.33	.0246	3.16	.06	1.78	71.99	1.99	.01	99.01	-.01	-0.	V
											S
7.50	.0246	3.20	.07	1.92	71.18	1.94	.01	94.82	.00	0.	V
											S
6.67	.0246	3.22	.08	2.08	70.28	1.89	.01	90.26	.03	0.	V
											S
5.83	.0075	3.19	.09	2.23	69.26	1.84	.01	85.25	.03	0.	V
											S
5.00	.0075	3.09	.09	2.36	68.08	1.79	.01	79.69	.06	1.	VVV
											SS
4.17	.0075	2.89	.08	2.44	66.66	1.75	.01	73.41	.09	1.	VVVVV
											SSSS
3.33	.0160	2.54	.13	2.41	65.08	1.71	.01	66.82	.26	3.	VVVVVVVVVVVVVV
											SSSSSSSSSSSSSS
2.50	.0667	2.06	.26	2.21	63.31	1.69	.01	60.10	1.08	15.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.45	.47	1.78	61.29	1.69	.01	53.13	1.08	13.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.72	1.08	58.80	1.78	.01	45.53	1.03	9.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 4500. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 840. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

PHYSICAL CONSTANTS	G= 9.81	COASTAL CONSTANTS	D50= .000950
	RHO=1027.00		D90= .001600
	KAPPA= .38		DELTA=1.650000
	TEMPERATURE= 15.00		BREAKERINDEX= .800000

SEASON NR 17
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -12.00 DEGREES (AT 10.M DEPTH)
REFR COEF .89 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .10% OF THE YEAR

REFRACTED WAVEHEIGHT 3.25 M
BREAKERANGLE -6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.04	.05	1.52	73.39	2.09	.01	106.47	.09	0.	|V
											|S
9.17	.0246	3.09	.05	1.63	72.72	2.04	.01	102.88	.07	0.	|V
											|S
8.33	.0246	3.13	.06	1.76	71.99	1.99	.01	99.00	.04	0.	|V
											|S
7.50	.0246	3.17	.07	1.91	71.18	1.94	.01	94.81	-.04	-0.	|V
											|S
6.67	.0246	3.20	.08	2.06	70.28	1.89	.01	90.25	-.19	-1.	|VVV
											|S
5.83	.0075	3.18	.08	2.22	69.26	1.84	.01	85.25	-.14	-1.	|VV
											|S
5.00	.0075	3.08	.09	2.35	68.08	1.80	.01	79.69	-.27	-2.	|VVVVV
											|SS
4.17	.0075	2.88	.08	2.43	66.66	1.75	.01	73.41	-.41	-3.	|VVVVVVV
											|SSSS
3.33	.0160	2.54	.14	2.40	65.10	1.71	.01	66.93	-1.01	-7.	|VVVVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSS
2.50	.0667	2.06	.28	2.20	63.36	1.69	.01	60.26	-3.04	-32.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.45	.49	1.77	61.37	1.70	.01	53.38	-2.85	-26.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.74	1.07	58.92	1.78	.01	45.87	-2.47	-18.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS -9826. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1809. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
=================================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                       D90= .001600
                KAPPA=    .38                     DELTA=1.650000
          TEMPERATURE=  15.00              BREAKERINDEX= .800000
**********************************************************


SEASON NR 18
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  10.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.37 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .63% OF THE YEAR
**********************************************************


REFRACTED WAVEHEIGHT 2.08 M
BREAKERANGLE  3. DEGREES

  D    ALFA   H   SETUP  U1   C    KSI    R    L       V      S
10.00 .0246  1.09   .01  .58 73.36  2.42  .01131.64  -.04    -0. IV
                                                                 IS
 9.17 .0246  1.11   .01  .62 72.68  2.37  .01126.78  -.04    -0. IV
                                                                 IS
 8.33 .0246  1.14   .01  .67 71.94  2.31  .01121.60  -.04    -0. IV
                                                                 IS
 7.50 .0246  1.16   .01  .73 71.12  2.24  .01116.05  -.03    -0. IV
                                                                 IS
 6.67 .0246  1.19   .01  .80 70.20  2.17  .01110.07  -.03    -0. IV
                                                                 IS
 5.83 .0075  1.23   .01  .89 69.17  2.10  .01103.58  -.01    -0. IV
                                                                 IS
 5.00 .0075  1.27   .02 1.00 67.97  2.02  .01 96.50   .00     0. IV
                                                                 IS
 4.17 .0075  1.33   .02 1.15 66.57  1.92  .01 88.68   .04     1. IV
                                                                 IS
 3.33 .0160  1.39   .03 1.36 64.86  1.82  .01 79.93   .30     6. IVVVVVVVVV
                                                                 ISSSSS
 2.50 .0667  1.41   .05 1.59 62.68  1.71  .01 69.90  1.68    62. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.23   .08 1.69 59.75  1.62  .01 58.27  1.80    75. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .29 1.25 56.26  1.60  .01 46.80  1.50    53. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    11430. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     2740. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC bV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 19
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 14.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.37 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 6.87% OF THE YEAR
****

REFRACTED WAVEHEIGHT 2.07 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.08	.01	.57	73.36	2.43	.01	131.64	-.06	-1.	IV
											IS
9.17	.0246	1.10	.01	.61	72.68	2.37	.01	126.78	-.05	-2.	IV
											IS
8.33	.0246	1.13	.01	.66	71.94	2.31	.01	121.60	-.05	-2.	IV
											IS
7.50	.0246	1.15	.01	.72	71.12	2.24	.01	116.05	-.05	-3.	IV
											IS
6.67	.0246	1.18	.01	.79	70.20	2.18	.01	110.07	-.04	-3.	IV
											IS
5.83	.0075	1.22	.01	.88	69.17	2.10	.01	103.58	-.01	-1.	IV
											IS
5.00	.0075	1.26	.02	1.00	67.97	2.02	.01	96.50	.00	0.	IV
											IS
4.17	.0075	1.32	.02	1.15	66.57	1.93	.01	88.68	.06	10.	IV
											IS
3.33	.0160	1.38	.03	1.35	64.86	1.82	.01	79.93	.40	95.	IVVVVVVVVVV
											ISSSS
2.50	.0667	1.40	.05	1.59	62.67	1.71	.01	69.89	2.07	920.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.22	.08	1.68	59.75	1.62	.01	58.25	2.22	1136.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.28	1.25	56.25	1.60	.01	46.75	1.84	808.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 171085. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 41159. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                  KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
**********************************************************


SEASON NR 20
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  10.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.38 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.14% OF THE YEAR
**********************************************************


REFRACTED WAVEHEIGHT 2.10 M
BREAKERANGLE  3. DEGREES

  D    ALFA  H    SETUP  U1   C    KSI    R    L      V        S
10.00 .0246  1.09  .01  .58 73.36  2.42  .01131.64  -.04     -0. |V
                                                                 |S
 9.17 .0246  1.11  .01  .62 72.68  2.37  .01126.78  -.04     -0. |V
                                                                 |S
 8.33 .0246  1.14  .01  .67 71.94  2.31  .01121.60  -.04     -0. |V
                                                                 |S
 7.50 .0246  1.16  .01  .73 71.12  2.24  .01116.05  -.04     -1. |V
                                                                 |S
 6.67 .0246  1.19  .01  .80 70.20  2.17  .01110.07  -.03     -1. |V
                                                                 |S
 5.83 .0075  1.23  .01  .89 69.17  2.10  .01103.58  -.01     -0. |V
                                                                 |S
 5.00 .0075  1.27  .02 1.00 67.97  2.02  .01 96.50   .00      0. |V
                                                                 |S
 4.17 .0075  1.33  .02 1.15 66.57  1.92  .01 88.68   .04      2. |V
                                                                 |S
 3.33 .0160  1.39  .03 1.36 64.86  1.82  .01 79.93   .31     23. |VVVVVVVVVV
                                                                 |SSSSS
 2.50 .0667  1.41  .05 1.59 62.68  1.71  .01 69.90  1.70    213. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.23  .09 1.69 59.75  1.62  .01 58.28  1.81    256. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72  .29 1.25 56.28  1.60  .01 46.86  1.51    182. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    39394. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     9444. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
===========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00               BREAKERINDEX= .800000
**********************************************************


SEASON NR 21
 WAVEHEIGHT   1.00 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION    2.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.38 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .19% OF THE YEAR
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REFRACTED WAVEHEIGHT 2.11 M
BREAKERANGLE   1. DEGREES

  D     ALFA   H     SETUP   U1   C     KSI    R    L        V         S
10.00 .0246  1.10    .01   .58 73.36  2.42   .01131.64  -.01       -0. |V
                                                                       |S
 9.17 .0246  1.12    .01   .62 72.68  2.36   .01126.79  -.01       -0. |V
                                                                       |S
 8.33 .0246  1.14    .01   .67 71.94  2.30   .01121.60  -.01       -0. |V
                                                                       |S
 7.50 .0246  1.17    .01   .73 71.12  2.24   .01116.05  -.01       -0. |V
                                                                       |S
 6.67 .0246  1.20    .01   .80 70.20  2.17   .01110.07  -.01       -0. |V
                                                                       |S
 5.83 .0075  1.24    .02   .89 69.17  2.10   .01103.58   .00        0. |V
                                                                       |S
 5.00 .0075  1.28    .02  1.01 67.97  2.01   .01 96.50  -.00       -0. |V
                                                                       |S
 4.17 .0075  1.34    .03  1.16 66.57  1.92   .01 88.69   .01        0. |V
                                                                       |S
 3.33 .0160  1.40    .03  1.37 64.86  1.82   .01 79.94   .07        0. |VVVVVVV
                                                                       |SSSSS
 2.50 .0667  1.41    .05  1.60 62.68  1.71   .01 69.91   .48        4. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.23    .09  1.69 59.76  1.62   .01 58.29   .52        5. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72    .29  1.25 56.30  1.60   .01 46.92   .45        3. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS      714. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      171. M3/SEASON (ACC TO BIJKER)
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     HYDRONAMIC BV
     PORT & WATERWAY ENGINEERS
     SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
===========================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                       D90= .001600
                 KAPPA=    .38                    DELTA=1.650000
           TEMPERATURE=  15.00              BREAKERINDEX= .800000
*************************************************************


SEASON NR 22
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION   10.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .81 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING      .76% OF THE YEAR
*************************************************************



REFRACTED WAVEHEIGHT 3.31 M
BREAKERANGLE  4. DEGREES

   D    ALFA   H   SETUP   U1   C     KSI    R     L       V       S
10.00 .0246  3.27   .06  1.72 73.40  1.98   .01131.93  -.05      -2. |V
                                                                     |S
 9.17 .0246  3.33   .07  1.84 72.73  1.94   .01127.13  -.04      -1. |V
                                                                     |S
 8.33 .0246  3.38   .07  1.98 72.00  1.90   .01122.03  -.02      -1. |V
                                                                     |S
 7.50 .0246  3.42   .09  2.13 71.20  1.85   .01116.57   .03       1. |V
                                                                     |S
 6.67 .0246  3.43   .09  2.28 70.30  1.81   .01110.68   .14       6. |VVV
                                                                     |S
 5.83 .0075  3.38   .10  2.42 69.28  1.77   .01104.28   .11       5. |VV
                                                                     |S
 5.00 .0075  3.25   .10  2.53 68.10  1.72   .01 97.22   .21      10. |VVVV
                                                                     |SSS
 4.17 .0075  2.99   .09  2.58 66.68  1.68   .01 89.31   .33      16. |VVVVVVV
                                                                     |SSSS
 3.33 .0160  2.61   .15  2.50 65.13  1.65   .01 81.28   .86      43. |VVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSS
 2.50 .0667  2.09   .29  2.26 63.39  1.63   .01 73.06  2.73     197. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .50  1.80 61.42  1.64   .01 64.65  2.58     162. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .76  1.08 58.99  1.73   .01 55.57  2.25     113. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    54264. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    11306. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 23
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 15.00 DEGREES (AT 10.M DEPTH)
REFR COEF .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 8.23% OF THE YEAR
****

REFRACTED WAVEHEIGHT 3.32 M
BREAKERANGLE 7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.25	.06	1.71	73.40	1.98	.01	131.92	-.08	-25.	|V |S
9.17	.0246	3.30	.06	1.83	72.73	1.94	.01	127.13	-.06	-20.	|V |S
8.33	.0246	3.35	.07	1.97	72.00	1.90	.01	122.02	-.01	-6.	|V |S
7.50	.0246	3.39	.08	2.11	71.20	1.85	.01	116.56	.08	32.	|V |S
6.67	.0246	3.41	.09	2.27	70.30	1.81	.01	110.67	.27	121.	|VVVV |S
5.83	.0075	3.36	.10	2.41	69.28	1.77	.01	104.27	.19	91.	|VVV |S
5.00	.0075	3.23	.10	2.52	68;10	1.73	.01	97.22	.35	177.	|VVVVV |SS
4.17	.0075	2.99	.09	2.57	66.68	1.68	.01	89.30	.52	278.	|VVVVVVVV |SSSS
3.33	.0160	2.61	.16	2.50	65.13	1.65	.01	81.30	1.26	719.	|VVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSS
2.50	.0667	2.09	.29	2.26	63.40	1.63	.01	73.09	3.54	3777.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.46	.50	1.80	61.43	1.64	.01	64.70	3.29	2923.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.76	1.08	59.01	1.73	.01	55.63	2.82	1903.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 971086. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 202023. M3/SEASON (ACC TO BIJKER)

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      HYDRONAMIC BV
      PORT & WATERWAY ENGINEERS
      SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
==============================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                           D90= .001600
               KAPPA=     .38                        DELTA=1.650000
         TEMPERATURE=   15.00                  BREAKERINDEX= .800000
*************************************************************

SEASON NR 24
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION   10.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.56% OF THE YEAR
*************************************************************

REFRACTED WAVEHEIGHT 3.35 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP  U1   C    KSI   R    L      V      S
10.00 .0246  3.27   .06  1.72 73.40 1.98  .01131.93 -.05    -5. |V
                                                                |S
 9.17 .0246  3.33   .07  1.84 72.73 1.94  .01127.14 -.04    -4. |V
                                                                |S
 8.33 .0246  3.38   .07  1.98 72.00 1.90  .01122.03 -.01    -1. |V
                                                                |S
 7.50 .0246  3.42   .09  2.13 71.20 1.85  .01116.57  .06     7. |V
                                                                |S
 6.67 .0246  3.43   .09  2.28 70.30 1.81  .01110.68  .19    27. |VVVV
                                                                |SS
 5.83 .0075  3.38   .10  2.42 69.28 1.77  .01104.28  .13    20. |VV
                                                                |S
 5.00 .0075  3.25   .10  2.53 68.10 1.72  .01 97.22  .24    39. |VVVVV
                                                                |SSS
 4.17 .0075  2.99   .09  2.58 66.68 1.68  .01 89.32  .36    60. |VVVVVVV
                                                                |SSSSS
 3.33 .0160  2.61   .16  2.50 65.14 1.65  .01 81.34  .91   155. |VVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSS
 2.50 .0667  2.09   .30  2.26 63.41 1.64  .01 73.15 2.80   695. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .51  1.79 61.45 1.64  .01 64.79 2.62   560. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .77  1.07 59.05 1.73  .01 55.76 2.27   389. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   206624. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    41013. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
==========================================================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
              RHO=1027.00                          D90= .001600
            KAPPA=    .38                        DELTA=1.650000
      TEMPERATURE=  15.00                 BREAKERINDEX= .800000
**********************************************************

SEASON NR 25
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION   2.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .82 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .23% OF THE YEAR
**********************************************************


REFRACTED WAVEHEIGHT 3.29 M
BREAKERANGLE  1. DEGREES

  D    ALFA   H    SETUP  U1   C    KSI    R     L      V      S
10.00 .0246  3.29   .06  1.73 73.40  1.98   .01131.93   -.01      -0.  |V
                                                                       |S
 9.17 .0246  3.34   .07  1.85 72.73  1.94   .01127.14   -.01      -0.  |V
                                                                       |S
 8.33 .0246  3.40   .08  1.99 72.00  1.89   .01122.03   -.00      -0.  |V
                                                                       |S
 7.50 .0246  3.43   .09  2.14 71.20  1.85   .01116.57    .01       0.  |V
                                                                       |S
 6.67 .0246  3.44   .10  2.29 70.30  1.81   .01110.69    .03       0.  |VV
                                                                       |SS
 5.83 .0075  3.39   .10  2.43 69.28  1.77   .01104.29    .02       0.  |V
                                                                       |S
 5.00 .0075  3.26   .10  2.54 68.10  1.72   .01 97.23    .05       1.  |VVV
                                                                       |SSS
 4.17 .0075  3.00   .09  2.59 66.68  1.68   .01 89.31    .07       1.  |VVVVV
                                                                       |SSSSS
 3.33 .0160  2.61   .15  2.51 65.12  1.65   .01 81.25    .19       3.  |VVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSS
 2.50 .0667  2.09   .29  2.26 63.38  1.63   .01 73.00    .82      12.  |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .50  1.80 61.40  1.64   .01 64.57    .82      10.  |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .75  1.08 58.96  1.72   .01 55.46    .79       6.  |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     3608. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      700. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
=========================================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00                BREAKERINDEX= .800000
*****************************************************************


SEASON NR 26
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION -19.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .81 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .11% OF THE YEAR
*****************************************************************



REFRACTED WAVEHEIGHT 3.25 M
BREAKERANGLE -8. DEGREES

  D    ALFA   H    SETUP  U1   C     KSI    R    L        V      S
10.00 .0246  3.22   .06  1.69 73.40  1.98   .01131.92    .09      0. |V
                                                                     |S
 9.17 .0246  3.27   .06  1.81 72.73  1.94   .01127.12    .07      0. |V
                                                                     |S
 8.33 .0246  3.32   .07  1.95 72.00  1.90   .01122.01    .04      0. |V
                                                                     |S
 7.50 .0246  3.37   .08  2.10 71.20  1.86   .01116.55   -.05     -0. |V
                                                                     |S
 6.67 .0246  3.38   .09  2.25 70.30  1.81   .01110.66   -.24     -1. |VVV
                                                                     |S
 5.83 .0075  3.34   .10  2.40 69.28  1.77   .01104.26   -.18     -1. |VV
                                                                     |S
 5.00 .0075  3.22   .10  2.51 68.10  1.73   .01 97.21   -.36     -2. |VVVVV
                                                                     |SS
 4.17 .0075  2.98   .09  2.56 66.68  1.69   .01 89.30   -.57     -4. |VVVVVVVV
                                                                     |SSS
 3.33 .0160  2.60   .15  2.50 65.11  1.65   .01 81.19  -1.42    -11. |VVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSS
 2.50 .0667  2.09   .28  2.26 63.36  1.63   .01 72.92  -3.93    -67. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .49  1.80 61.37  1.64   .01 64.45  -3.67    -52. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .74  1.08 58.92  1.72   .01 55.30  -3.13    -32. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   -14138. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    -3241. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                          D90= .001600
               KAPPA=     .38                       DELTA=1.650000
         TEMPERATURE=   15.00                BREAKERINDEX= .800000
**********************************************************


SEASON NR 27
 WAVEHEIGHT   4.50 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION   10.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .53 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .12%-OF THE YEAR
**********************************************************



REFRACTED WAVEHEIGHT 3.26 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP  U1   C    KSI   R    L      V       S
10.00 .0246  4.77   .12  2.50 73.45 1.86  .01132.25  -.04     -0. |V
                                                                  |S
 9.17 .0246  4.76   .12  2.63 72.78 1.83  .01127.48  -.03     -0. |V
                                                                  |S
 8.33 .0246  4.71   .13  2.75 72.05 1.80  .01122.36  -.02     -0. |V
                                                                  |S
 7.50 .0246  4.60   .13  2.86 71.24 1.77  .01116.85   .01      0. |V
                                                                  |S
 6.67 .0246  4.42   .12  2.93 70.33 1.74  .01110.88   .09      1. |VV
                                                                  |S
 5.83 .0075  4.15   .11  2.97 69.29 1.71  .01104.34   .08      1. |V
                                                                  |S
 5.00 .0075  3.79   .09  2.96 68.08 1.68  .01 97.12   .17      2. |VVV
                                                                  |SS
 4.17 .0075  3.34   .06  2.89 66.64 1.65  .01 89.08   .29      3. |VVVVVV
                                                                  |SSSS
 3.33 .0160  2.79   .17  2.67 65.16 1.64  .01 81.41   .80      7. |VVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSS
 2.50 .0667  2.17   .33  2.32 63.50 1.63  .01 73.55  2.69     31. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.47   .54  1.80 61.54 1.65  .01 65.15  2.58     26. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .76  1.07 59.02 1.73  .01 55.66  2.25     18. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     8191. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     1750. M3/SEASON (ACC TO BIJKER)
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        HYDRONAMIC BV
        PORT & WATERWAY ENGINEERS
        SLIEDRECHT-HOLLAND

 CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
 ==============================================================================================

 PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                   RHO=1027.00                        D90= .001600
                 KAPPA=     .38                     DELTA=1.650000
           TEMPERATURE=  15.00               BREAKERINDEX= .800000
 ***************************************************************************

 SEASON NR 28
  WAVEHEIGHT   4.50 M (HRMS IN DEEP WATER)
  PERIOD      12.00 SEC
  DIRECTION   14.00 DEGREES (AT 10.M DEPTH)
  REFF COEF     .56 (AT 10.M DEPTH)

 THIS WAVE CLIMATE OCCURS DURING   1.37% OF THE YEAR
 ***************************************************************************


 REFRACTED WAVEHEIGHT 3.34 M
 BREAKERANGLE   6. DEGREES

   D     ALFA   H    SETUP   U1     C     KSI     R     L        V        S
 10.00 .0246  4.74   .11  2.49 73.45  1.86   .01132.25  -.05      -4. |V
                                                                        |S
  9.17 .0246  4.74   .12  2.62 72.78  1.83   .01127.47  -.04      -3. |V
                                                                        |S
  8.33 .0246  4.69   .13  2.74 72.05  1.80   .01122.36  -.01      -1. |V
                                                                        |S
  7.50 .0246  4.58   .13  2.85 71.24  1.77   .01116.85   .05       5. |V
                                                                        |S
  6.67 .0246  4.41   .12  2.93 70.33  1.74   .01110.87   .20      19. |VVV
                                                                        |SS
  5.83 .0075  4.14   .11  2.97 69.29  1.71   .01104.33   .15      15. |VV
                                                                        |S
  5.00 .0075  3.79   .09  2.96 68.08  1.68   .01 97.12   .29      29. |VVVVV
                                                                        |SSS
  4.17 .0075  3.34   .07  2.88 66.64  1.65   .01 89.08   .45      45. |VVVVVVV
                                                                        |SSSS
  3.33 .0160  2.79   .18  2.67 65.20  1.64   .01 81.60  1.15     114. |VVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSS
  2.50 .0667  2.16   .35  2.31 63.56  1.63   .01 73.80  3.41     580. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  1.67 .0667  1.47   .56  1.79 61.62  1.65   .01 65.47  3.21     458. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
   .83 .0667   .74   .79  1.07 59.13  1.73   .01 56.06  2.75     300. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
 TOTAL TRANSPORT IS    150640. M3/SEASON (ACC TO CERC)
 TOTAL TRANSPORT IS     31945. M3/SEASON (ACC TO BIJKER)
```

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 29
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF .56 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .43% OF THE YEAR
****

REFRACTED WAVEHEIGHT 3.36 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	4.77	.12	2.50	73.45	1.86	.01	132.25	-.04	-1.	|V
											|S
9.17	.0246	4.76	.12	2.63	72.78	1.83	.01	127.48	-.03	-1.	|V
											|S
8.33	.0246	4.71	.13	2.75	72.05	1.80	.01	122.36	-.01	-0.	|V
											|S
7.50	.0246	4.60	.13	2.86	71.24	1.77	.01	116.85	.04	1.	|V
											|S
6.67	.0246	4.42	.12	2.93	70.33	1.74	.01	110.88	.15	5.	|VVV
											|SS
5.83	.0075	4.15	.11	2.97	69.29	1.71	.01	104.34	.11	3.	|VV
											|S
5.00	.0075	3.79	.09	2.96	68.08	1.68	.01	97.12	.22	7.	|VVVV
											|SSS
4.17	.0075	3.34	.07	2.88	66.65	1.65	.01	89.12	.34	10.	|VVVVVVV
											|SSSSS
3.33	.0160	2.79	.19	2.67	65.21	1.64	.01	81.65	.87	26.	|VVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSSS
2.50	.0667	2.17	.36	2.31	63.57	1.63	.01	73.86	2.80	118.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSsSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.47	.56	1.79	61.64	1.65	.01	65.55	2.65	96.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.79	1.06	59.16	1.73	.01	56.16	2.30	67.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											|SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 34446. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 7034. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

==

PHYSICAL CONSTANTS	G= 9.81	COASTAL CONSTANTS	D50= .000950
	RHO=1027.00		D90= .001600
	KAPPA= .38		DELTA=1.650000
	TEMPERATURE= 15.00		BREAKERINDEX= .800000

****

SEASON NR 30
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 13.00 DEGREES (AT 10.M DEPTH)
REFR COEF .80 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .29% OF THE YEAR

****

REFRACTED WAVEHEIGHT 3.41 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.48	.07	1.88	73.41	1.90	.01	156.88	-.05	-1.	IV IS
9.17	.0246	3.54	.08	2.01	72.74	1.86	.01	150.95	-.03	-0.	IV IS
8.33	.0246	3.59	.09	2.15	72.01	1.83	.01	144.68	.01	0.	IV IS
7.50	.0246	3.62	.10	2.30	71.21	1.79	.01	138.00	.09	1.	IV IS
6.67	.0246	3.61	.11	2.45	70.32	1.75	.01	130.84	.27	5.	IVVVV ISS
5.83	.0075	3.54	.11	2.58	69.30	1.71	.01	123.09	.18	3.	IVVV IS
5.00	.0075	3.37	.11	2.66	68.11	1.67	.01	114.58	.33	6.	IVVVVV ISSS
4.17	.0075	3.08	.10	2.68	66.71	1.64	.01	105.16	.49	9.	IVVVVVVVV ISSSS
3.33	.0160	2.66	.17	2.57	65.17	1.61	.01	95.65	1.17	23.	IVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSS
2.50	.0667	2.12	.31	2.29	63.45	1.59	.01	85.97	3.34	114.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.47	.53	1.81	61.51	1.60	.01	76.15	3.09	88.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.79	1.07	59.14	1.68	.01	65.61	2.66	59.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 30093. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 6479. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

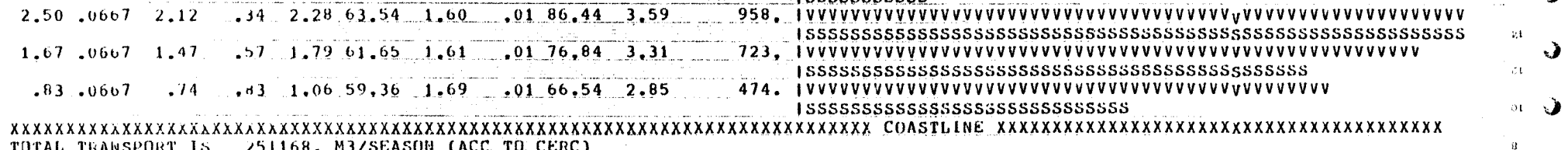
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 31
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 14.00 DEGREES (AT 10.M DEPTH)
REFR COEF .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.05% OF THE YEAR

REFRACTED WAVEHEIGHT 3.58 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.47	.07	1.88	73.41	1.90	.01	156.88	-.05	-4.	
9.17	.0246	3.53	.08	2.01	72.74	1.86	.01	150.95	-.02	-2.	
8.33	.0246	3.58	.09	2.15	72.01	1.83	.01	144.67	.04	4.	
7.50	.0246	3.61	.10	2.30	71.21	1.79	.01	138.00	.17	18.	
6.67	.0246	3.61	.11	2.45	70.32	1.75	.01	130.84	.41	48.	
5.83	.0075	3.54	.11	2.57	69.30	1.71	.01	123.09	.25	31.	
5.00	.0075	3.37	.11	2.66	68.11	1.67	.01	114.58	.42	55.	
4.17	.0075	3.08	.12	2.67	66.74	1.64	.01	105.33	.58	78.	
3.33	.0160	2.66	.20	2.56	65.22	1.61	.01	95.95	1.32	189.	
2.50	.0667	2.12	.34	2.28	63.54	1.60	.01	86.44	3.59	958.	
1.67	.0667	1.47	.57	1.79	61.65	1.61	.01	76.84	3.31	723.	
.83	.0667	.74	.83	1.06	59.36	1.69	.01	66.54	2.85	474.	



TOTAL TRANSPORT IS 251168. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 55107. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
==================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                    RHO=1027.00                       D90= .001600
                  KAPPA=     .38                    DELTA=1.650000
            TEMPERATURE=   15.00               BREAKERINDEX= .800000
*****************************************************************


SEASON NR 32
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION  13.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .90 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .64% OF THE YEAR
*****************************************************************


REFRACTED WAVEHEIGHT 3.74 M
BREAKERANGLE  6. DEGREES

   D    ALFA    H    SETUP   U1    C     KSI     R    L      V         S
10.00 .0246  3.48   .07  1.88 73.41  1.90   .01156.88  -.04        -1. |V
                                                                       |S
 9.17 .0246  3.54   .08  2.01 72.74  1.86   .01150.95   .01         0. |V
                                                                       |S
 8.33 .0246  3.59   .09  2.15 72.01  1.83   .01144.68   .10         3. |V
                                                                       |S
 7.50 .0246  3.62   .10  2.30 71.21  1.79   .01138.00   .29        10. |VVVV
                                                                       |S
 6.67 .0246  3.61   .11  2.45 70.32  1.75   .01130.85   .59        22. |VVVVVVVVV
                                                                       |SSSS
 5.83 .0075  3.54   .11  2.58 69.30  1.71   .01123.09   .32        13. |VVVVV
                                                                       |SS
 5.00 .0075  3.37   .11  2.66 68.11  1.67   .01114.58   .49        20. |VVVVVVVV
                                                                       |SSSS
 4.17 .0075  3.08   .13  2.67 66.76  1.64   .01105.51   .62        26. |VVVVVVVVVV
                                                                       |SSSSS
 3.33 .0160  2.66   .22  2.55 65.27  1.61   .01 96.26  1.34        60. |VVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSS
 2.50 .0667  2.12   .38  2.27 63.63  1.60   .01 86.92  3.58       295. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.47   .61  1.77 61.80  1.62   .01 77.53  3.28       219. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .88  1.04 59.58  1.71   .01 67.47  2.83       144. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     88398. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     18349. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 3
=========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=   15.00               BREAKERINDEX= .800000
*************************************************************

SEASON NR 33
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION  14.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .54 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .68% OF THE YEAR
*************************************************************


REFRACTED WAVEHEIGHT 3.46 M
BREAKERANGLE  6. DEGREES

   D    ALFA   H   SETUP  U1    C   KSI    R     L      V         S
10.00 .0246  5.02  .13  2.71 73.46 1.80  .01157.34  -.04      -2. |V
                                                                   |S
 9.17 .0246  5.00  .14  2.83 72.80 1.77  .01151.43  -.02      -1. |V
                                                                   |S
 8.33 .0246  4.93  .15  2.95 72.07 1.74  .01145.13   .01       0. |V
                                                                   |S
 7.50 .0246  4.79  .14  3.04 71.26 1.72  .01138.38   .08       4. |V
                                                                   |S
 6.67 .0246  4.58  .13  3.09 70.35 1.69  .01131.08   .26      13. |VVVV
                                                                   |SS
 5.83 .0075  4.27  .12  3.11 69.30 1.66  .01123.14   .18       9. |VVV
                                                                   |S
 5.00 .0075  3.88  .10  3.07 68.09 1.64  .01114.42   .33      17. |VVVVV
                                                                   |SSS
 4.17 .0075  3.40  .09  2.96 66.69 1.61  .01105.02   .50      24. |VVVVVVVV
                                                                   |SSSS
 3.33 .0160  2.83  .21  2.71 65.26 1.60  .01 96.16  1.22      60. |VVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSS
 2.50 .0667  2.18  .38  2.33 63.64 1.59  .01 86.99  3.52     306. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.48  .59  1.80 61.74 1.61  .01 77.25  3.29     237. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  .82  1.06 59.31 1.69  .01 66.31  2.82     154. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    76879. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    17293. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 3

===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

****

SEASON NR 34
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 13.00 DEGREES (AT 10.M DEPTH)
REFR COEF .58 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

****

REFRACTED WAVEHEIGHT 3.63 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	5.03	.13	2.72	73.46	1.80	.011	57.35	-.03	-0.	IV IS
9.17	.0246	5.01	.14	2.84	72.80	1.77	.011	51.43	-.01	-0.	IV IS
8.33	.0246	4.93	.15	2.95	72.07	1.74	.011	45.13	.04	1.	IV IS
7.50	.0246	4.79	.14	3.04	71.26	1.72	.011	38.38	.16	2.	IVV IS
6.67	.0246	4.58	.13	3.10	70.35	1.69	.011	31.08	.39	6.	IVVVVVV ISSS
5.83	.0075	4.28	.12	3.11	69.30	1.66	.011	23.14	.24	4.	IVVVV ISS
5.00	.0075	3.88	.10	3.07	68.09	1.64	.011	14.42	.39	6.	IVVVVVV ISSS
4.17	.0075	3.40	.12	2.95	66.74	1.61	.011	05.38	.54	8.	IVVVVVVVVV ISSSSS
3.33	.0160	2.83	.25	2.70	65.34	1.60	.01	96.64	1.25	19.	IVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSS
2.50	.0667	2.18	.42	2.32	63.75	1.60	.01	87.61	3.53	94.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.48	.64	1.78	61.90	1.62	.01	78.03	3.27	71.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.87	1.04	59.54	1.70	.01	67.29	2.80	47.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 26898. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 5745. M3/SEASON (ACC TO BIJKER)

TOTAL TRANSPORT 782660.M3/YEAR
NEGAT TRANSPORT -7073.M3/YEAR
POSIT TRANSPORT 789740.M3/YEAR
DOMINANT NEGAT WAVE DIRECTION -7.
DOMINANT POSIT WAVE DIRECTION 5.

Calculated transport in profile 4

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
==========================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                         D90= .001600
               KAPPA=    .38                       DELTA=1.650000
         TEMPERATURE=  15.00                BREAKERINDEX= .800000
**************************************************************


SEASON NR  1
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  35.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.04 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .17% OF THE YEAR
**************************************************************


REFRACTED WAVEHEIGHT 1.33 M
BREAKERANGLE 12. DEGREES

  D    ALFA   H   SETUP  U1   C    KSI     R    L      V      S
10.00 .0236   .87  .00  .39 73.36  2.89   .01 80.08  -.10     -0. |VVVV
                                                                  |S
 9.17 .0236   .88  .00  .43 72.68  2.81   .01 77.76  -.10     -0. |VVVV
                                                                  |S
 8.33 .0236   .89  .00  .47 71.94  2.72   .01 75.19  -.09     -0. |VVVV
                                                                  |S
 7.50 .0040   .91  .01  .51 71.12  2.64   .01 72.33  -.02     -0. |V
                                                                  |S
 6.67 .0437   .93  .01  .57 70.20  2.54   .01 69.14  -.15     -0. |VVVVVV
                                                                  |S
 5.83 .0437   .95  .01  .63 69.16  2.44   .01 65.57  -.14     -0. |VVVVVV
                                                                  |S
 5.00 .0437   .98  .01  .72 67.96  2.33   .01 61.55  -.13     -0. |VVVVV
                                                                  |S
 4.17 .0437  1.02  .01  .84 66.54  2.21   .01 56.96  -.11     -0. |VVVV
                                                                  |S
 3.33 .0437  1.07  .02 1.00 64.82  2.08   .01 51.68  -.02     -0. |V
                                                                  |S
 2.50 .0272  1.12  .03 1.24 62.62  1.93   .01 45.46   .35      2. |VVVVVVVVVVVVVVV
                                                                  |SSSSSSSSS
 1.67 .0272  1.08  .03 1.48 59.52  1.77   .01 37.75  1.17     11. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .70  .14 1.28 55.17  1.68   .01 28.89  1.34     13. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     3462. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      776. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                          D90= .001600
                 KAPPA=     .38                       DELTA=1.650000
           TEMPERATURE=   15.00                BREAKERINDEX= .800000
**********************************************************


SEASON NR  2
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  28.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.05 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING  18.53% OF THE YEAR
**********************************************************



REFRACTED WAVEHEIGHT 1.35 M
BREAKERANGLE 10. DEGREES

  D    ALFA   H    SETUP   U1    C    KSI     R    L       V        S
10.00 .0236   .90   .00   .41 73.36  2.87   .01 80.08  -.09       -1. |VVVV
                                                                       |S
 9.17 .0236   .91   .00   .44 72.68  2.79   .01 77.76  -.09       -2. |VVVV
                                                                       |S
 8.33 .0236   .93   .00   .48 71.94  2.70   .01 75.19  -.08       -3. |VVVV
                                                                       |S
 7.50 .0040   .94   .01   .53 71.12  2.61   .01 72.33  -.01       -1. |V
                                                                       |S
 6.67 .0437   .96   .01   .59 70.20  2.52   .01 69.15  -.14      -14. |VVVVVV
                                                                       |S
 5.83 .0437   .99   .01   .66 69.16  2.42   .01 65.57  -.13      -20. |VVVVVV
                                                                       |S
 5.00 .0437  1.02   .01   .75 67.96  2.32   .01 61.55  -.11      -26. |VVVVV
                                                                       |S
 4.17 .0437  1.06   .01   .87 66.55  2.20   .01 56.97  -.09      -31. |VVVV
                                                                       |S
 3.33 .0437  1.11   .02  1.04 64.82  2.06   .01 51.69   .01        4. |V
                                                                       |S
 2.50 .0272  1.16   .03  1.27 62.62  1.92   .01 45.47   .37      257. |VVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSS
 1.67 .0272  1.10   .04  1.50 59.53  1.77   .01 37.77  1.10     1088. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .70   .15  1.29 55.21  1.69   .01 28.96  1.20     1224. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   356819. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    76741. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

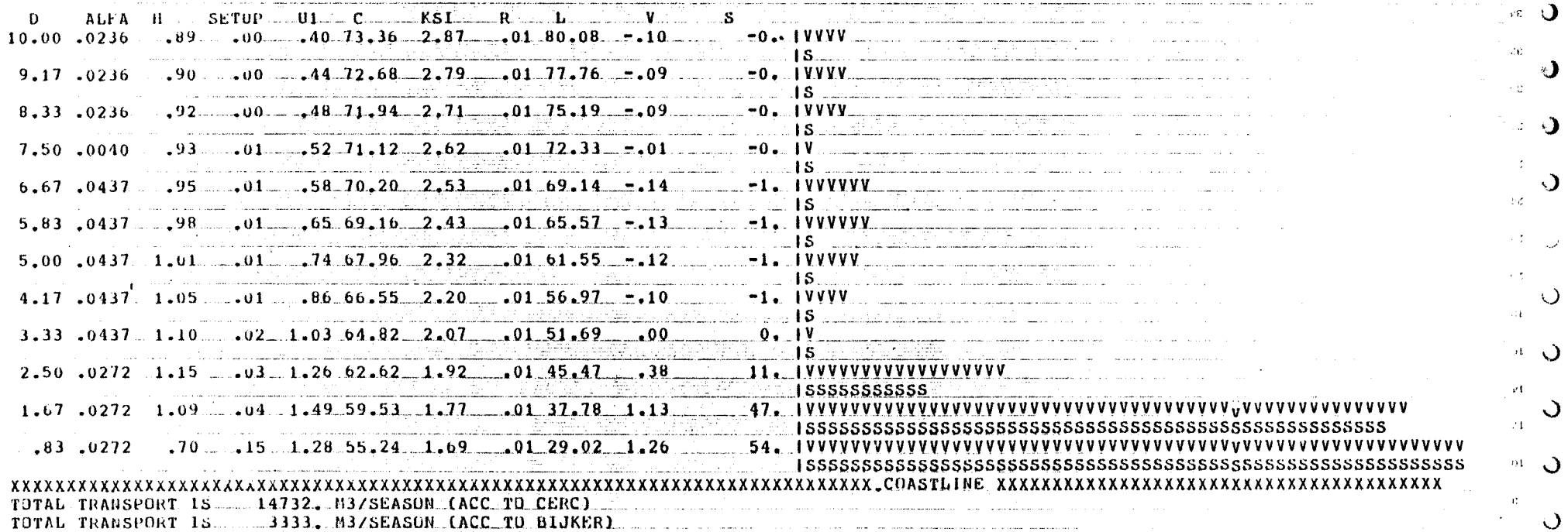
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 3
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 30.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.05 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .77% OF THE YEAR

REFRACTED WAVEHEIGHT 1.37 M
BREAKERANGLE 11. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	.89	.00	.40	73.36	2.87	.01	80.08	-.10	-0.	
9.17	.0236	.90	.00	.44	72.68	2.79	.01	77.76	-.09	-0.	
8.33	.0236	.92	.00	.48	71.94	2.71	.01	75.19	-.09	-0.	
7.50	.0040	.93	.01	.52	71.12	2.62	.01	72.33	-.01	-0.	
6.67	.0437	.95	.01	.58	70.20	2.53	.01	69.14	-.14	-1.	
5.83	.0437	.98	.01	.65	69.16	2.43	.01	65.57	-.13	-1.	
5.00	.0437	1.01	.01	.74	67.96	2.32	.01	61.55	-.12	-1.	
4.17	.0437	1.05	.01	.86	66.55	2.20	.01	56.97	-.10	-1.	
3.33	.0437	1.10	.02	1.03	64.82	2.07	.01	51.69	.00	0.	
2.50	.0272	1.15	.03	1.26	62.62	1.92	.01	45.47	.38	11.	
1.67	.0272	1.09	.04	1.49	59.53	1.77	.01	37.78	1.13	47.	
.83	.0272	.70	.15	1.28	55.24	1.69	.01	29.02	1.26	54.	



TOTAL TRANSPORT IS 14732. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 3333. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
=============================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                 KAPPA=     .38                     DELTA=1.650000
           TEMPERATURE=  15.00               BREAKERINDEX= .800000
*************************************************************


SEASON NR  4
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  11.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.05 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .51% OF THE YEAR
*************************************************************


REFRACTED WAVEHEIGHT 1.42 M
BREAKERANGLE  4. DEGREES

  D     ALFA   H    SETUP   U1   C     KSI     R    L       V       S
10.00 .0236   .94   .00   .43 73.36  2.83   .01 80.08  -.04      -0. |VVV
                                                                        |S
 9.17 .0236   .96   .00   .46 72.68  2.76   .01 77.76  -.04      -0. |VVV
                                                                        |S
 8.33 .0236   .97   .01   .50 71.94  2.67   .01 75.19  -.04      -0. |VVV
                                                                        |S
 7.50 .0040   .99   .01   .55 71.12  2.59   .01 72.33  -.01      -0. |V
                                                                        |S
 6.67 .0437  1.01   .01   .61 70.20  2.50   .01 69.15  -.06      -0. |VVVVV
                                                                        |S
 5.83 .0437  1.03   .01   .69 69.16  2.40   .01 65.58  -.06      -0. |VVVVV
                                                                        |S
 5.00 .0437  1.06   .01   .78 67.96  2.29   .01 61.55  -.05      -0. |VVVV
                                                                        |S
 4.17 .0437  1.11   .02   .91 66.55  2.18   .01 56.98  -.04      -0. |VVV
                                                                        |S
 3.33 .0437  1.16   .02  1.08 64.83  2.05   .01 51.70   .02       0. |V
                                                                        |S
 2.50 .0272  1.20   .03  1.32 62.63  1.90   .01 45.49   .20       4. |VVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSS
 1.67 .0272  1.12   .04  1.53 59.55  1.76   .01 37.83   .57      14. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .70   .16  1.28 55.31  1.69   .01 29.14   .64      14. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS      4438. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS       974. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
=========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
              RHO=1027.00                           D90= .001600
                KAPPA=    .38                     DELTA=1.650000
          TEMPERATURE=  15.00            BREAKERINDEX= .800000
************************************************************


SEASON NR  5
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  -4.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.05 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .24% OF THE YEAR
************************************************************



REFRACTED WAVEHEIGHT 1.43 M
BREAKERANGLE -2. DEGREES

  D    ALFA   H   SETUP  U1   C    KSI    R    L      V      S
10.00 .0236  .95  .00  .43 73.36 2.83   .01 80.08   .02          0. |VVV
                                                                    |S
 9.17 .0236  .96  .00  .47 72.68 2.75   .01 77.76   .01          0. |VVV
                                                                    |S
 8.33 .0236  .98  .01  .51 71.94 2.67   .01 75.19   .01          0. |VVV
                                                                    |S
 7.50 .0040  .99  .01  .56 71.12 2.58   .01 72.33   .00          0. |V
                                                                    |S
 6.67 .0437 1.01  .01  .62 70.20 2.49   .01 69.15   .02          0. |VVVVV
                                                                    |S
 5.83 .0437 1.01  .01  .69 69.16 2.40   .01 65.58   .02          0. |VVVV
                                                                    |S
 5.00 .0437 1.07  .01  .79 67.96 2.29   .01 61.56   .02          0. |VVVV
                                                                    |S
 4.17 .0437 1.11  .02  .91 66.55 2.17   .01 56.98   .02          0. |VVV
                                                                    |S
 3.33 .0437 1.17  .02 1.09 64.83 2.04   .01 51.70  -.01         -0. |V
                                                                    |S
 2.50 .0272 1.21  .03 1.33 62.63 1.90   .01 45.49  -.08         -1. |VVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSS
 1.67 .0272 1.13  .04 1.54 59.56 1.76   .01 37.84  -.23         -3. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272  .71  .16 1.28 55.32 1.69   .01 29.17  -.26         -3. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    -776. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    -172. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

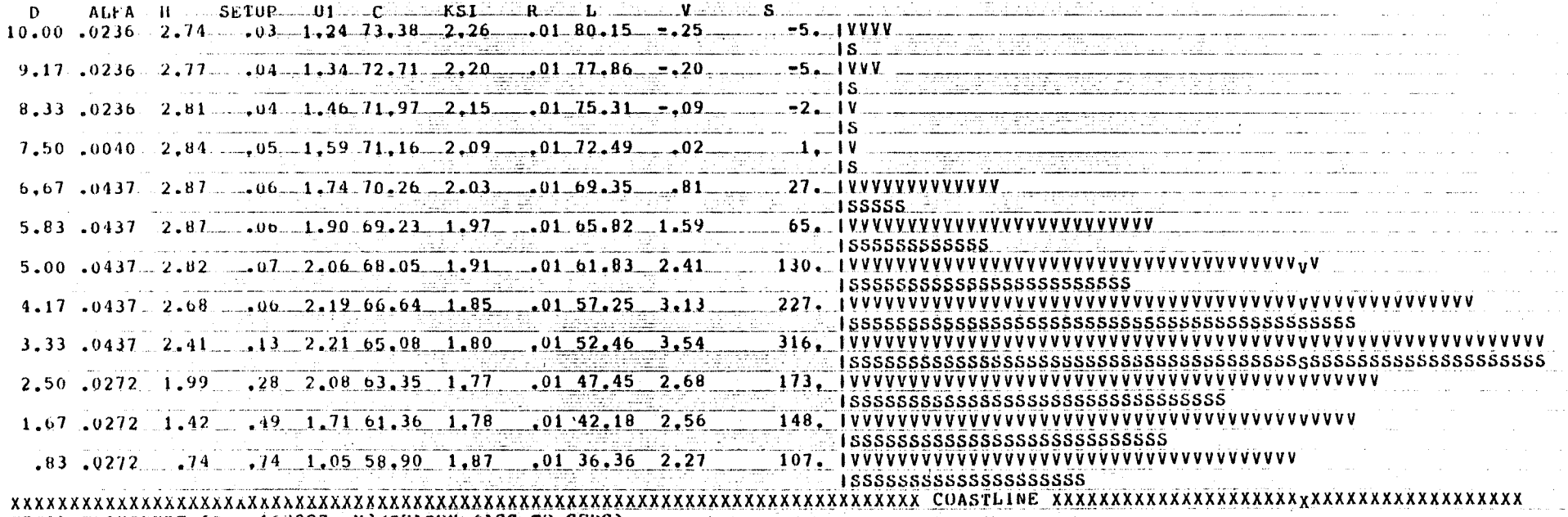
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 6
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 6.00 SEC
DIRECTION 27.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.01 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR

REFRACTED WAVEHEIGHT 3.24 M
BREAKERANGLE 15. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	2.74	.03	1.24	73.38	2.26	.01	80.15	-.25	-5.	
9.17	.0236	2.77	.04	1.34	72.71	2.20	.01	77.86	-.20	-5.	
8.33	.0236	2.81	.04	1.46	71.97	2.15	.01	75.31	-.09	-2.	
7.50	.0040	2.84	.05	1.59	71.16	2.09	.01	72.49	.02	1.	
6.67	.0437	2.87	.06	1.74	70.26	2.03	.01	69.35	.81	27.	
5.83	.0437	2.87	.06	1.90	69.23	1.97	.01	65.82	1.59	65.	
5.00	.0437	2.82	.07	2.06	68.05	1.91	.01	61.83	2.41	130.	
4.17	.0437	2.68	.06	2.19	66.64	1.85	.01	57.25	3.13	227.	
3.33	.0437	2.41	.13	2.21	65.08	1.80	.01	52.46	3.54	316.	
2.50	.0272	1.99	.28	2.08	63.35	1.77	.01	47.45	2.68	173.	
1.67	.0272	1.42	.49	1.71	61.36	1.78	.01	42.18	2.56	148.	
.83	.0272	.74	.74	1.05	58.90	1.87	.01	36.36	2.27	107.	



TOTAL TRANSPORT IS 162027. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 27340. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC bV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

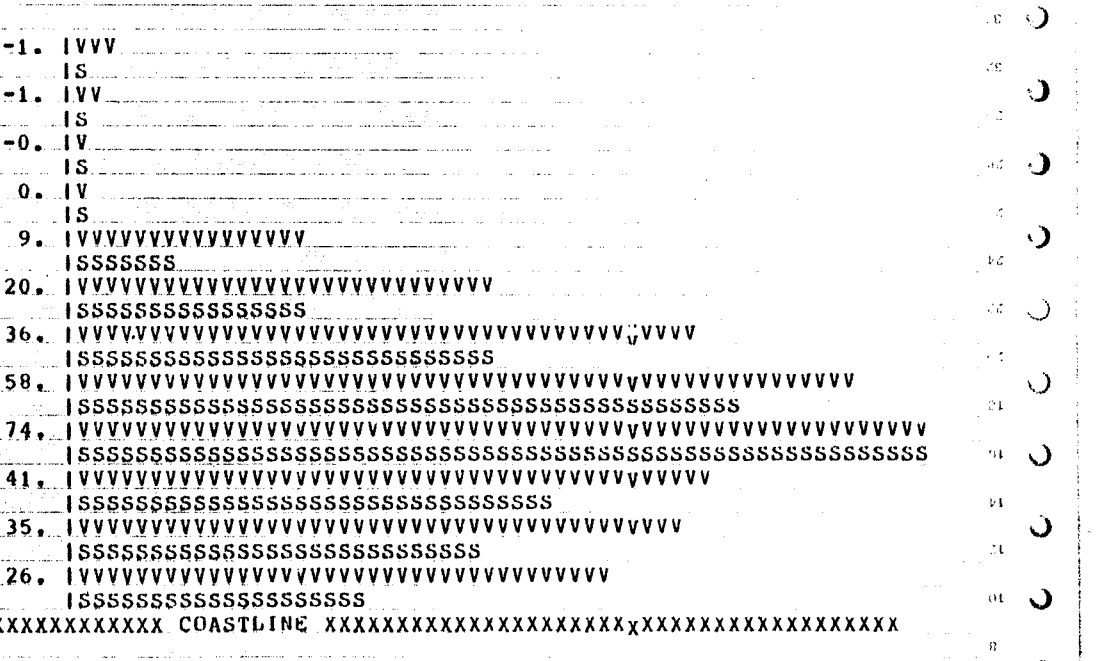
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 7
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 20.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.04 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

REFRACTED WAVEHEIGHT 3.40 M
BREAKERANGLE 11. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	2.79	.03	1.26	73.38	2.25	.01	80.15	-.20	-1.	
9.17	.0236	2.83	.04	1.36	72.71	2.20	.01	77.86	-.14	-1.	
8.33	.0236	2.86	.04	1.48	71.97	2.14	.01	75.32	-.03	-0.	
7.50	.0040	2.89	.05	1.62	71.16	2.08	.01	72.50	.03	0.	
6.67	.0437	2.92	.06	1.77	70.26	2.02	.01	69.35	.87	9.	
5.83	.0437	2.92	.07	1.93	69.23	1.96	.01	65.83	1.56	20.	
5.00	.0437	2.86	.07	2.09	68.05	1.90	.01	61.84	2.27	36.	
4.17	.0437	2.70	.07	2.21	66.65	1.84	.01	57.30	2.86	58.	
3.33	.0437	2.42	.16	2.22	65.14	1.80	.01	52.62	3.16	74.	
2.50	.0272	2.00	.31	2.07	63.44	1.78	.01	47.70	2.35	41.	
1.67	.0272	1.42	.53	1.70	61.50	1.78	.01	42.55	2.23	35.	
.83	.0272	.74	.78	1.04	59.13	1.88	.01	36.86	2.00	26.	



TOTAL TRANSPORT IS 41543. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 6824. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

==

PHYSICAL CONSTANTS G= 9.81   COASTAL CONSTANTS D50= .000950
RHO=1027.00   D90= .001600
KAPPA= .38   DELTA=1.650000
TEMPERATURE= 15.00   BREAKERINDEX= .800000

****

SEASON NR 8
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 32.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.14 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.25% OF THE YEAR

****

REFRACTED WAVEHEIGHT 1.56 M
BREAKERANGLE 10. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	.95	.00	.48	73.36	2.63	.01	106.29	-.09	-0.	VVV
											S
9.17	.0236	.97	.01	.51	72.68	2.56	.01	102.66	-.09	-0.	VVV
											S
8.33	.0236	.98	.01	.56	71.94	2.49	.01	98.73	-.08	-1.	VVV
											S
7.50	.0040	1.00	.01	.61	71.12	2.42	.01	94.48	-.01	-0.	V
											S
6.67	.0437	1.03	.01	.67	70.20	2.34	.01	89.85	-.13	-2.	VVVVV
											S
5.83	.0437	1.06	.01	.74	69.16	2.25	.01	84.77	-.12	-3.	VVVV
											S
5.00	.0437	1.10	.01	.84	67.96	2.16	.01	79.17	-.10	-3.	VVVV
											S
4.17	.0437	1.14	.02	.97	66.55	2.05	.01	72.93	-.04	-2.	V
											S
3.33	.0437	1.20	.03	1.16	64.84	1.94	.01	65.87	.30	20.	VVVVVVVVVVV
											SSSSS
2.50	.0272	1.25	.04	1.40	62.64	1.81	.01	57.69	.87	85.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0272	1.15	.05	1.59	59.60	1.68	.01	47.86	1.51	204.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0272	.71	.19	1.29	55.53	1.63	.01	37.12	1.43	185.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 61570. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 14644. M3/SEASON (ACC TO BIJKER)

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     HYDRONAMIC BV
     PORT & WATERWAY ENGINEERS
     SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
=========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
*******************************************************************


SEASON NR  9
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  25.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING  23.34% OF THE YEAR
*******************************************************************


REFRACTED WAVEHEIGHT 1.62 M
BREAKERANGLE   8. DEGREES

  D    ALFA   H   SETUP   U1   C     KSI    R    L      V        S
10.00 .0236   .98   .00   .49 73.36  2.61  .01106.30  -.08      -3. |VVV
                                                                    |S
 9.17 .0236  1.00   .01   .53 72.68  2.54  .01102.66  -.08      -5. |VVV
                                                                    |S
 8.33 .0236  1.01   .01   .57 71.94  2.47  .01 98.74  -.07      -6. |VVV
                                                                    |S
 7.50 .0040  1.04   .01   .63 71.12  2.40  .01 94.48  -.01      -1. |V
                                                                    |S
 6.67 .0437  1.06   .01   .69 70.20  2.32  .01 89.85  -.11     -21. |VVVVV
                                                                    |S
 5.83 .0437  1.09   .01   .77 69.16  2.24  .01 84.78  -.10     -27. |VVVV
                                                                    |S
 5.00 .0437  1.13   .01   .87 67.97  2.14  .01 79.18  -.09     -32. |VVV
                                                                    |S
 4.17 .0437  1.18   .02  1.00 66.55  2.04  .01 72.94  -.02     -11. |V
                                                                    |S
 3.33 .0437  1.23   .03  1.19 64.84  1.93  .01 65.88   .32     228. |VVVVVVVVVVVVVV
                                                                    |SSSSSSS
 2.50 .0272  1.28   .04  1.43 62.65  1.80  .01 57.71   .82     847. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.16   .06  1.60 59.62  1.68  .01 47.92  1.36    1836. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .71   .20  1.28 55.62  1.63  .01 37.33  1.26    1588. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   553945. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   132925. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
=============================================================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                       D90= .001600
               KAPPA=    .38                     DELTA=1.650000
         TEMPERATURE=  15.00              BREAKERINDEX= .800000
******************************************************************


SEASON NR 10
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  19.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   7.26% OF THE YEAR
******************************************************************


REFRACTED WAVEHEIGHT 1.65 M
BREAKERANGLE  6. DEGREES

  D    ALFA   H   SETUP  U1   C     KSI    R    L       V      S
10.00 .0236  1.00  .00   .50 73.36  2.60  .01106.30  -.06     -1. |VVV
                                                                  |S
 9.17 .0236  1.01  .01   .54 72.68  2.53  .01102.66  -.06     -1. |VVV
                                                                  |S
 8.33 .0236  1.03  .01   .58 71.94  2.46  .01 98.74  -.06     -2. |VV
                                                                  |S
 7.50 .0040  1.06  .01   .64 71.12  2.39  .01 94.48  -.01     -0. |V
                                                                  |S
 6.67 .0437  1.08  .01   .70 70.20  2.31  .01 89.85  -.09     -6. |VVVV
                                                                  |S
 5.83 .0437  1.11  .01   .78 69.16  2.23  .01 84.78  -.08     -7. |VVVV
                                                                  |S
 5.00 .0437  1.15  .01   .89 67.97  2.14  .01 79.18  -.07     -8. |VVV
                                                                  |S
 4.17 .0437  1.20  .02  1.02 66.56  2.03  .01 72.94  -.01     -2. |V
                                                                  |S
 3.33 .0437  1.26  .03  1.21 64.84  1.92  .01 65.89   .28     64. |VVVVVVVVVVVVVV
                                                                  |SSSSSSSS
 2.50 .0272  1.30  .04  1.45 62.65  1.79  .01 57.73   .71    222. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.17  .06  1.62 59.63  1.68  .01 47.95  1.15    461. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .71  .20  1.28 55.66  1.63  .01 37.44  1.07    387. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   138482. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    33408. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

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PHYSICAL CONSTANTS G= 9.81 RHO=1027.00 KAPPA= .38 TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950 D90= .001600 DELTA=1.650000 BREAKERINDEX= .800000

****

SEASON NR 11
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .64% OF THE YEAR

****

REFRACTED WAVEHEIGHT 1.69 M
BREAKERANGLE 3. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	1.02	.01	.51	73.36	2.59	.01	106.30	-.04	-0.	IVV IS
9.17	.0236	1.03	.01	.55	72.68	2.52	.01	102.66	-.03	-0.	IVV IS
8.33	.0236	1.05	.01	.59	71.94	2.45	.01	98.74	-.03	-0.	IVV IS
7.50	.0040	1.07	.01	.65	71.12	2.38	.01	94.49	-.00	-0.	IV IS
6.67	.0437	1.10	.01	.71	70.20	2.30	.01	89.85	-.05	-0.	IVVVV IS
5.83	.0437	1.13	.01	.80	69.16	2.22	.01	84.78	-.05	-0.	IVVV IS
5.00	.0437	1.17	.02	.90	67.97	2.13	.01	79.19	-.04	-0.	IVVV IS
4.17	.0437	1.22	.02	1.04	66.56	2.03	.01	72.95	-.00	-0.	IV IS
3.33	.0437	1.28	.03	1.23	64.84	1.91	.01	65.90	.17	3.	IVVVVVVVVVVVVVV ISSSSSSSSS
2.50	.0272	1.31	.04	1.48	62.65	1.79	.01	57.74	.43	11.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0272	1.18	.06	1.63	59.64	1.67	.01	47.98	.71	23.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0272	.72	.21	1.28	55.71	1.63	.01	37.55	.67	18.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 6782. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 1647. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
               RHO=1027.00                           D90= .001600
              KAPPA=     .38                       DELTA=1.650000
        TEMPERATURE=   15.00                 BREAKERINDEX= .800000
**********************************************************


SEASON NR 12
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  -3.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.14 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .30% OF THE YEAR
**********************************************************


REFRACTED WAVEHEIGHT 1.68 M
BREAKERANGLE -1. DEGREES

  D     ALFA    H    SETUP   U1    C     KSI    R     L       V        S
10.00 .0236  1.02    .01   .51 73.36  2.58   .01106.30    .01         0. |VV
                                                                          |S
 9.17 .0236  1.04    .01   .55 72.68  2.52   .01102.66    .01         0. |VV
                                                                          |S
 8.33 .0236  1.06    .01   .60 71.94  2.45   .01 98.74    .01         0. |VV
                                                                          |S
 7.50 .0040  1.08    .01   .65 71.12  2.38   .01 94.49    .00         0. |V
                                                                          |S
 6.67 .0437  1.11    .01   .72 70.20  2.30   .01 89.86    .02         0. |VVV
                                                                          |S
 5.83 .0437  1.14    .01   .80 69.16  2.22   .01 84.78    .01         0. |VVV
                                                                          |S
 5.00 .0437  1.18    .02   .91 67.97  2.13   .01 79.19    .01         0. |VVV
                                                                          |S
 4.17 .0437  1.23    .02  1.05 66.56  2.03   .01 72.95    .00         0. |V
                                                                          |S
 3.33 .0437  1.29    .03  1.24 64.84  1.91   .01 65.90   -.05        -0. |VVVVVVVVVVVVV
                                                                          |SSSSSSSS
 2.50 .0272  1.32    .04  1.48 62.66  1.79   .01 57.74   -.13        -2. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                          |SSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.18    .06  1.63 59.64  1.67   .01 47.98   -.23        -3. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                          |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .72    .21  1.28 55.70  1.63   .01 37.53   -.23        -3. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                          |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     -955. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     -234. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 13
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 32.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.14 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR

REFRACTED WAVEHEIGHT 3.85 M
BREAKERANGLE 16. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	2.88	.04	1.44	73.39	2.11	.01	106.45	-.11	-3.	
9.17	.0236	2.93	.05	1.55	72.72	2.06	.01	102.85	.10	3.	
8.33	.0236	2.97	.05	1.67	71.98	2.01	.01	98.97	.45	13.	
7.50	.0040	3.02	.06	1.81	71.17	1.96	.01	94.78	.17	5.	
6.67	.0437	3.05	.07	1.97	70.27	1.91	.01	90.21	2.40	116.	
5.83	.0437	3.05	.08	2.13	69.25	1.86	.01	85.21	3.25	219.	
5.00	.0437	2.98	.08	2.28	68.07	1.80	.01	79.65	3.98	390.	
4.17	.0437	2.81	.12	2.36	66.75	1.76	.01	73.77	4.44	577.	
3.33	.0437	2.50	.23	2.33	65.29	1.72	.01	67.67	4.59	662.	
2.50	.0272	2.04	.40	2.13	63.68	1.71	.01	61.45	3.36	271.	
1.67	.0272	1.44	.64	1.70	61.89	1.72	.01	55.11	3.11	212.	
.83	.0272	.74	.91	1.02	59.72	1.83	.01	48.23	2.74	147.	

TOTAL TRANSPORT IS 25/935. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 5/981. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
==========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                          D90= .001600
               KAPPA=     .38                       DELTA=1.650000
         TEMPERATURE=   15.00                BREAKERINDEX= .800000
***********************************************************


SEASON NR 14
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  25.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.13 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   7.35% OF THE YEAR
***********************************************************


REFRACTED WAVEHEIGHT 3.92 M
BREAKERANGLE 13. DEGREES

  D    ALFA   H   SETUP  U1    C    KSI    R     L      V      S
10.00 .0236  2.96  .04 1.48 73.39  2.10  .01106.46  -.10    -26. IV
                                                                 IS
 9.17 .0236  3.00  .05 1.59 72.72  2.05  .01102.86   .08     24. IV
                                                                 IS
 8.33 .0236  3.05  .06 1.72 71.99  2.00  .01 98.99   .39    122. IVVVVV
                                                                 IS
 7.50 .0040  3.09  .07 1.86 71.18  1.95  .01 94.79   .15     51. IVV
                                                                 IS
 6.67 .0437  3.12  .07 2.01 70.28  1.90  .01 90.23  2.17   1068. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSS
 5.83 .0437  3.11  .08 2.17 69.26  1.85  .01 85.23  2.95   1940. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSS
 5.00 .0437  3.03  .08 2.31 68.07  1.80  .01 79.67  3.61   3272. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0437  2.84  .13 2.39 66.76  1.76  .01 73.83  4.02   4618. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0437  2.52  .24 2.35 65.31  1.72  .01 67.76  4.14   5159. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0272  2.05  .41 2.13 63.72  1.71  .01 61.58  3.00   2252. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.44  .65 1.70 61.95  1.73  .01 55.29  2.79   1783. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSS
  .83 .0272   .74  .93 1.01 59.81  1.83  .01 48.48  2.47   1274. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS  2300858. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   480061. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

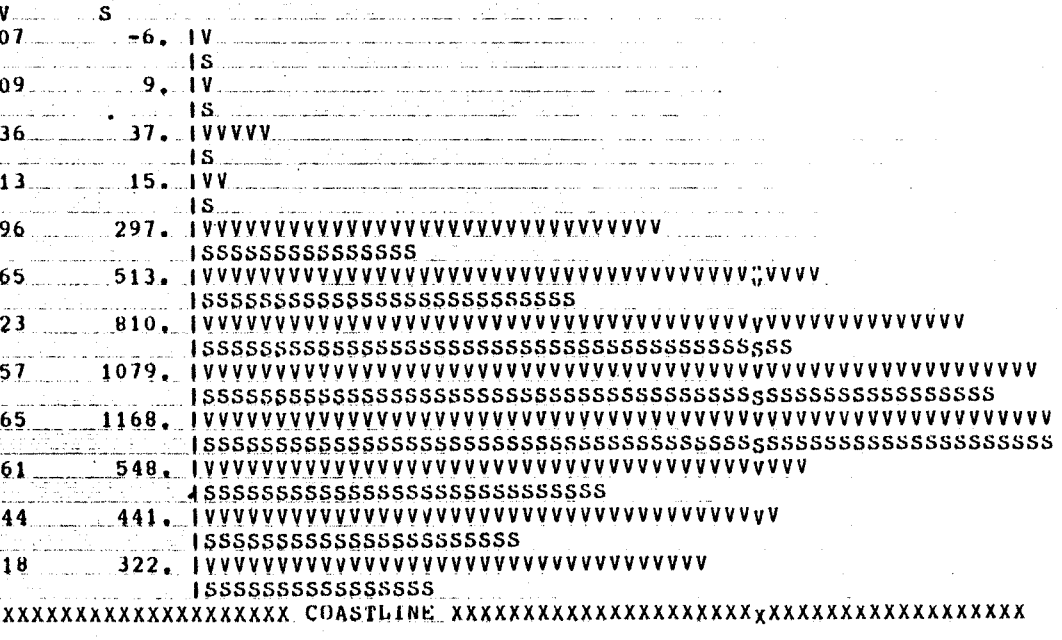
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 15
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 19.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.14 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.35% OF THE YEAR

REFRACTED WAVEHEIGHT 4.02 M
BREAKERANGLE 10. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.00	.04	1.50	73.39	2.09	.01	106.46	-.07	-6.	
9.17	.0236	3.05	.05	1.61	72.72	2.04	.01	102.87	.09	9.	
8.33	.0236	3.10	.06	1.74	71.99	2.00	.01	98.99	.36	37.	
7.50	.0040	3.14	.07	1.89	71.18	1.95	.01	94.80	.13	15.	
6.67	.0437	3.16	.08	2.04	70.28	1.90	.01	90.24	1.96	297.	
5.83	.0437	3.15	.08	2.20	69.26	1.85	.01	85.24	2.65	513.	
5.00	.0437	3.06	.09	2.33	68.08	1.80	.01	79.69	3.23	810.	
4.17	.0437	2.86	.14	2.40	66.78	1.76	.01	73.91	3.57	1079.	
3.33	.0437	2.53	.25	2.35	65.34	1.72	.01	67.89	3.65	1168.	
2.50	.0272	2.05	.43	2.13	63.77	1.71	.01	61.78	2.61	548.	
1.67	.0272	1.44	.68	1.69	62.03	1.73	.01	55.57	2.44	441.	
.83	.0272	.74	.96	1.00	59.93	1.84	.01	48.85	2.18	322.	



TOTAL TRANSPORT IS 601743. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 117317. M3/SEASON (ACC TO BIJKER)

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        HYDRONAMIC BV
        PORT & WATERWAY ENGINEERS
        SLIEDRECHT-HOLLAND


  CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
  ==========================================================================================

  PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                    RHO=1027.00                        D90= .001600
                    KAPPA=    .38                    DELTA=1.650000
              TEMPERATURE=  15.00               BREAKERINDEX= .800000
  ************************************************************


  SEASON NR 16
   WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
   PERIOD     10.00 SEC
   DIRECTION  10.00 DEGREES (AT 10.M DEPTH)
   REFR COEF   1.14 (AT 10.M DEPTH)

  THIS WAVE CLIMATE OCCURS DURING    .21% OF THE YEAR
  ************************************************************



  REFRACTED WAVEHEIGHT 3.98 M
  BREAKERANGLE  5. DEGREES

    D    ALFA   H    SETUP   U1    C    KSI     R    L      V       S
  10.00 .0236  3.05   .05  1.52 73.39  2.08   .01106.47  -.04      -0. |V
                                                                       |S
   9.17 .0236  3.10   .05  1.64 72.72  2.04   .01102.88   .06       0. |V
                                                                       |S
   8.33 .0236  3.14   .06  1.77 71.99  1.99   .01 99.00   .21       2. |VVVVV
                                                                       |SS
   7.50 .0040  3.18   .07  1.91 71.18  1.94   .01 94.81   .08       1. |V
                                                                       |S
   6.67 .0437  3.20   .08  2.07 70.28  1.89   .01 90.25  1.28      15. |VVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSS
   5.83 .0437  3.18   .09  2.22 69.26  1.84   .01 85.25  1.77      25. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSS
   5.00 .0437  3.09   .09  2.35 68.08  1.80   .01 79.69  2.19      36. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
   4.17 .0437  2.88   .14  2.42 66.78  1.75   .01 73.89  2.44      45. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
   3.33 .0437  2.54   .25  2.36 65.33  1.72   .01 67.86  2.50      47. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
   2.50 .0272  2.06   .42  2.14 63.75  1.71   .01 61.71  1.73      26. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
   1.67 .0272  1.45   .67  1.70 62.00  1.73   .01 55.48  1.63      21. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSS
    .83 .0272   .74   .95  1.00 59.89  1.84   .01 48.73  1.51      15. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSS
   XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
   TOTAL TRANSPORT IS     31327. M3/SEASON (ACC TO CERC)
   TOTAL TRANSPORT IS      5284. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 17
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -3.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.14 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .10% OF THE YEAR

REFRACTED WAVEHEIGHT 4.00 M
BREAKERANGLE -2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.06	.05	1.53	73.39	2.08	.01	106.47	.01	0.	V
											S
9.17	.0236	3.11	.05	1.65	72.72	2.04	.01	102.88	-.02	-0.	V
											S
8.33	.0236	3.16	.06	1.78	71.99	1.99	.01	99.01	-.06	-0.	VVV
											SS
7.50	.0040	3.20	.07	1.92	71.18	1.94	.01	94.82	-.02	-0.	V
											S
6.67	.0437	3.22	.08	2.08	70.28	1.89	.01	90.26	-.44	-2.	VVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSS
5.83	.0437	3.19	.09	2.23	69.26	1.84	.01	85.25	-.65	-4.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
5.00	.0437	3.09	.09	2.36	68.08	1.79	.01	79.69	-.84	-5.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0437	2.89	.14	2.42	66.78	1.75	.01	73.91	-.96	-6.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0437	2.54	.25	2.36	65.34	1.72	.01	67.88	-1.00	-7.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0272	2.06	.43	2.14	63.76	1.71	.01	61.75	-.64	-4.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0272	1.45	.67	1.69	62.02	1.73	.01	55.54	-.63	-3.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSS
.83	.0272	.74	.96	1.00	59.92	1.84	.01	48.81	-.65	-2.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS -4559. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -756. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
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PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
               RHO=1027.00                          D90= .001600
               KAPPA=   .38                       DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
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SEASON NR 18
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  30.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   .63% OF THE YEAR
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REFRACTED WAVEHEIGHT 1.85 M
BREAKERANGLE  9. DEGREES

  D    ALFA   H   SETUP  U1   C     KS1    R    L      V      S
10.00 .0236  1.03  .01  .54 73.36  2.45  .01131.64  -.09    -0. |VV
                                                                |S
 9.17 .0236  1.05  .01  .58 72.68  2.40  .01126.78  -.08    -0. |VV
                                                                |S
 8.33 .0236  1.07  .01  .63 71.94  2.33  .01121.60  -.08    -0. |VV
                                                                |S
 7.50 .0040  1.10  .01  .69 71.12  2.27  .01116.04  -.01    -0. |V
                                                                |S
 6.67 .0437  1.12  .01  .75 70.20  2.20  .01110.06  -.12    -1. |VVVV
                                                                |S
 5.83 .0437  1.16  .01  .84 69.16  2.12  .01103.57  -.10    -1. |VVV
                                                                |S
 5.00 .0437  1.20  .02  .95 67.97  2.04  .01 96.48  -.05    -1. |V
                                                                |S
 4.17 .0437  1.25  .02 1.09 66.56  1.94  .01 88.66   .20     3. |VVVVVV
                                                                |SS
 3.33 .0437  1.31  .03 1.28 64.85  1.84  .01 79.89   .97    24. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSS
 2.50 .0272  1.35  .04 1.53 62.66  1.72  .01 69.84  1.42    48. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.20  .07 1.66 59.69  1.62  .01 58.04  1.77    72. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .72  .24 1.27 55.95  1.59  .01 45.88  1.53    56. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   23260. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    5824. M3/SEASON (ACC TO BIJKER)
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        HYDRONAMIC BV
        PORT & WATERWAY ENGINEERS
        SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
==================================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                         D90= .001600
               KAPPA=    .38                       DELTA=1.650000
         TEMPERATURE=  15.00                 BREAKERINDEX= .800000
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SEASON NR 19
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  24.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.27 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   6.87% OF THE YEAR
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REFRACTED WAVEHEIGHT 1.87 M
BREAKERANGLE  8. DEGREES

  D    ALFA   H   SETUP  U1   C     KSI     R    L      V       S
10.00 .0236  1.06  .01  .56 73.36  2.44   .01131.64  -.08      -1. |VV
                                                                   |S
 9.17 .0236  1.08  .01  .60 72.68  2.38   .01126.78  -.07      -2. |VV
                                                                   |S
 8.33 .0236  1.10  .01  .65 71.94  2.32   .01121.60  -.07      -2. |VV
                                                                   |S
 7.50 .0040  1.12  .01  .70 71.12  2.26   .01116.04  -.01      -1. |V
                                                                   |S
 6.67 .0437  1.15  .01  .77 70.20  2.19   .01110.06  -.10      -7. |VVV
                                                                   |S
 5.83 .0437  1.19  .01  .86 69.17  2.11   .01103.58  -.09      -8. |VVV
                                                                   |S
 5.00 .0437  1.23  .02  .97 67.97  2.03   .01 96.49  -.03      -4. |V
                                                                   |S
 4.17 .0437  1.28  .02 1.12 66.56  1.93   .01 88.67   .22      37. |VVVVVVVV
                                                                   |SSS
 3.33 .0437  1.34  .03 1.32 64.85  1.83   .01 79.91   .94     255. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0272  1.37  .04 1.56 62.67  1.72   .01 69.86  1.32     470. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.21  .07 1.67 59.69  1.62   .01 58.06  1.59     675. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0272   .72  .25 1.27 55.97  1.59   .01 45.94  1.36     503. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   232725. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    55467. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 20
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.14% OF THE YEAR

REFRACTED WAVEHEIGHT 1.89 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	1.08	.01	.57	73.36	2.43	.01	131.64	-.06	-0.	VV
											S
9.17	.0236	1.09	.01	.61	72.68	2.37	.01	126.78	-.06	-0.	VV
											S
8.33	.0236	1.12	.01	.66	71.94	2.31	.01	121.60	-.05	-1.	VV
											S
7.50	.0040	1.14	.01	.72	71.12	2.25	.01	116.05	-.01	-0.	V
											S
6.67	.0437	1.17	.01	.79	70.20	2.18	.01	110.06	-.08	-2.	VVV
											S
5.83	.0437	1.21	.01	.87	69.17	2.10	.01	103.58	-.07	-2.	VVV
											S
5.00	.0437	1.25	.02	.99	67.97	2.02	.01	96.50	-.02	-1.	V
											S
4.17	.0437	1.31	.02	1.14	66.56	1.93	.01	88.68	.18	10.	VVVVVVVV
											SSS
3.33	.0437	1.37	.03	1.34	64.85	1.82	.01	79.92	.78	64.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSS
2.50	.0272	1.39	.05	1.58	62.67	1.71	.01	69.88	1.10	116.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0272	1.22	.07	1.68	59.70	1.61	.01	58.09	1.33	164.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0272	.72	.25	1.27	55.99	1.59	.01	46.01	1.14	120.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 56439. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 13492. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4
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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
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SEASON NR 21
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .19% OF THE YEAR
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REFRACTED WAVEHEIGHT 1.92 M
BREAKERANGLE 3. DEGREES

D	ALFA	H	SETUP	U1	C	KS1	R	L	V	S	
10.00	.0236	1.09	.01	.58	73.36	2.42	.01	131.64	-.03	-0.	IVV
											IS
9.17	.0236	1.11	.01	.62	72.68	2.37	.01	126.78	-.03	-0.	IVV
											IS
8.33	.0236	1.14	.01	.67	71.94	2.31	.01	121.60	-.03	-0.	IVV
											IS
7.50	.0040	1.16	.01	.73	71.12	2.24	.01	116.05	-.00	-0.	IV
											IS
6.67	.0437	1.19	.01	.80	70.20	2.17	.01	110.07	-.05	-0.	IVVV
											IS
5.83	.0437	1.23	.01	.89	69.17	2.10	.01	103.58	-.04	-0.	IVV
											IS
5.00	.0437	1.27	.02	1.00	67.97	2.02	.01	96.50	-.01	-0.	IV
											IS
4.17	.0437	1.33	.02	1.15	66.57	1.92	.01	88.68	.11	1.	IVVVVVVV
											ISSS
3.33	.0437	1.39	.03	1.36	64.86	1.82	.01	79.93	.51	3.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0272	1.41	.05	1.59	62.67	1.71	.01	69.89	.71	6.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0272	1.23	.08	1.69	59.71	1.61	.01	58.12	.86	9.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0272	.72	.26	1.27	56.04	1.59	.01	46.13	.75	6.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 2916. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 699. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

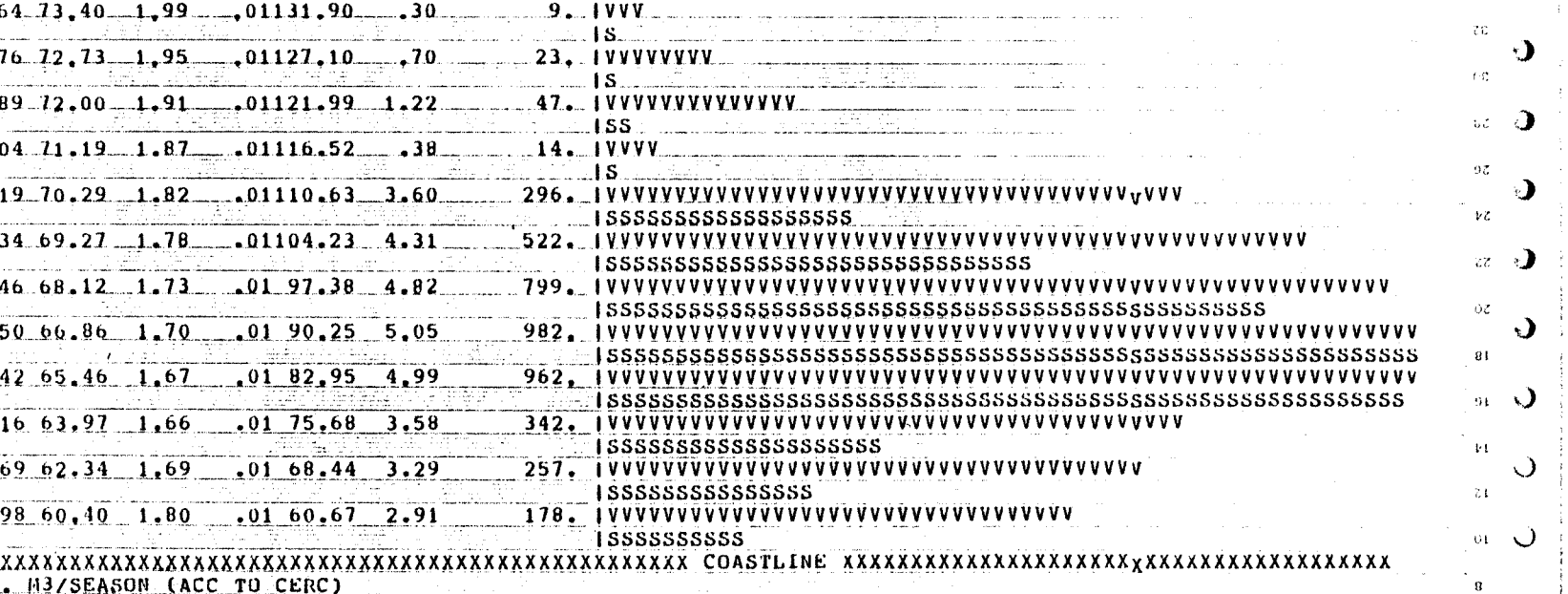
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 22
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 30.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .76% OF THE YEAR

REFRACTED WAVEHEIGHT 4.40 M
BREAKERANGLE 14. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.12	.05	1.64	73.40	1.99	.01	131.90	.30	9.	
9.17	.0236	3.17	.06	1.76	72.73	1.95	.01	127.10	.70	23.	
8.33	.0236	3.22	.07	1.89	72.00	1.91	.01	121.99	1.22	47.	
7.50	.0040	3.27	.08	2.04	71.19	1.87	.01	116.52	.38	14.	
6.67	.0437	3.29	.09	2.19	70.29	1.82	.01	110.63	3.60	296.	
5.83	.0437	3.27	.09	2.34	69.27	1.78	.01	104.23	4.31	522.	
5.00	.0437	3.16	.12	2.46	68.12	1.73	.01	97.38	4.82	799.	
4.17	.0437	2.94	.18	2.50	66.86	1.70	.01	90.25	5.05	982.	
3.33	.0437	2.58	.31	2.42	65.46	1.67	.01	82.95	4.99	962.	
2.50	.0272	2.08	.50	2.16	63.97	1.66	.01	75.68	3.58	342.	
1.67	.0272	1.45	.77	1.69	62.34	1.69	.01	68.44	3.29	257.	
.83	.0272	.74	1.07	.98	60.40	1.80	.01	60.67	2.91	178.	



TOTAL TRANSPORT IS 361633. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 96384. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

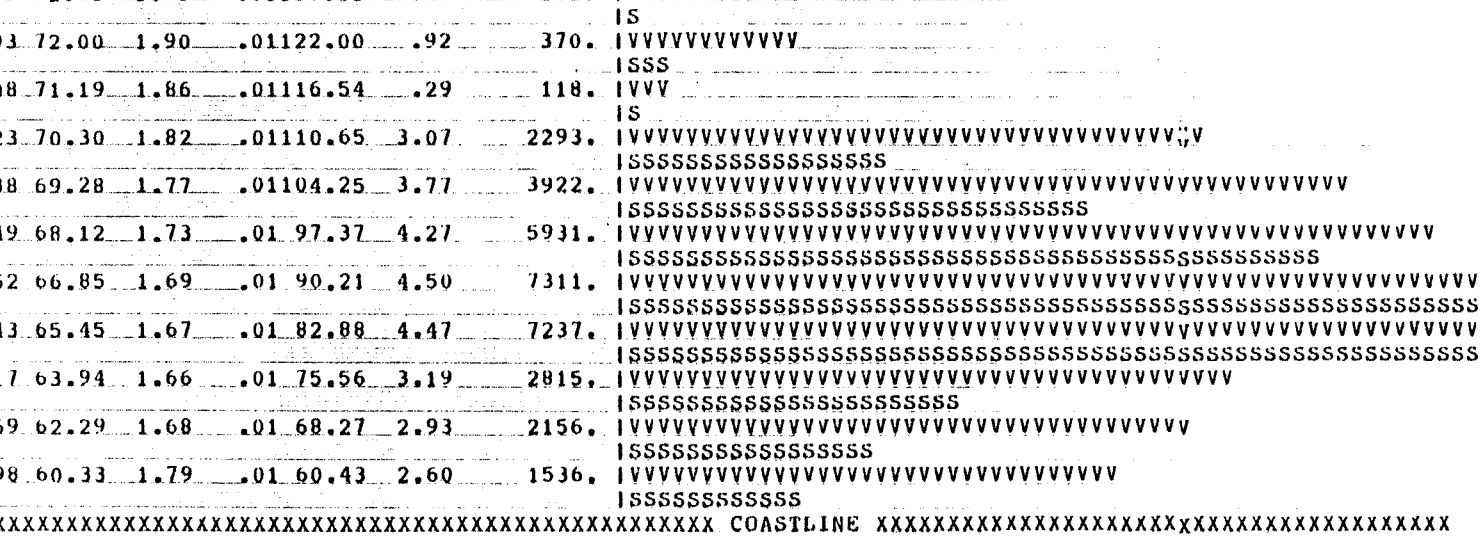
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 23
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 24.00 DEGREES (AT 10,M DEPTH)
REFR COEF 1.18 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 8.23% OF THE YEAR

REFRACTED WAVEHEIGHT 4.35 M
BREAKERANGLE 12. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.18	.05	1.67	73.40	1.99	.01	131.91	.17	54.	
9.17	.0236	3.23	.06	1.79	72.73	1.95	.01	127.11	.48	171.	
8.33	.0236	3.29	.07	1.93	72.00	1.90	.01	122.00	.92	370.	
7.50	.0040	3.33	.08	2.08	71.19	1.86	.01	116.54	.29	118.	
6.67	.0437	3.35	.09	2.23	70.30	1.82	.01	110.65	3.07	2293.	
5.83	.0437	3.32	.10	2.38	69.28	1.77	.01	104.25	3.77	3922.	
5.00	.0437	3.20	.12	2.49	68.12	1.73	.01	97.37	4.27	5931.	
4.17	.0437	2.96	.18	2.52	66.85	1.69	.01	90.21	4.50	7311.	
3.33	.0437	2.59	.30	2.43	65.45	1.67	.01	82.88	4.47	7237.	
2.50	.0272	2.08	.49	2.17	63.94	1.66	.01	75.56	3.19	2815.	
1.67	.0272	1.46	.76	1.69	62.29	1.68	.01	68.27	2.93	2156.	
.83	.0272	.74	1.05	.98	60.33	1.79	.01	60.43	2.60	1536.	



TOTAL TRANSPORT IS 3143706. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 745358. M3/SEASON (ACC TO DIJKER)

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

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PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

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SEASON NR 24
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 16.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.20 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.56% OF THE YEAR

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REFRACTED WAVEHEIGHT 4.49 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.23	.06	1.70	73.40	1.98	.01	131.92	.18	18.	VV S
9.17	.0236	3.28	.06	1.82	72.73	1.94	.01	127.13	.46	52.	VVVVVV S
8.33	.0236	3.34	.07	1.96	72.00	1.90	.01	122.02	.85	107.	VVVVVVVVVVVV SSSS
7.50	.0040	3.38	.08	2.10	71.20	1.86	.01	116.55	.26	33.	VVV S
6.67	.0437	3.39	.09	2.26	70.30	1.81	.01	110.67	2.80	600.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSS
5.83	.0437	3.35	.10	2.40	69.28	1.77	.01	104.27	3.39	954.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
5.00	.0437	3.22	.13	2.51	68.14	1.73	.01	97.46	3.80	1343.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0437	2.98	.19	2.53	66.88	1.69	.01	90.35	3.97	1577.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0437	2.60	.32	2.43	65.49	1.67	.01	83.10	3.92	1528.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0272	2.09	.52	2.16	64.01	1.66	.01	75.90	2.76	650.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0272	1.46	.79	1.68	62.41	1.69	.01	68.75	2.56	510.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSS
.83	.0272	.74	1.09	.97	60.50	1.80	.01	61.07	2.30	375.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 799883. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 172194. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

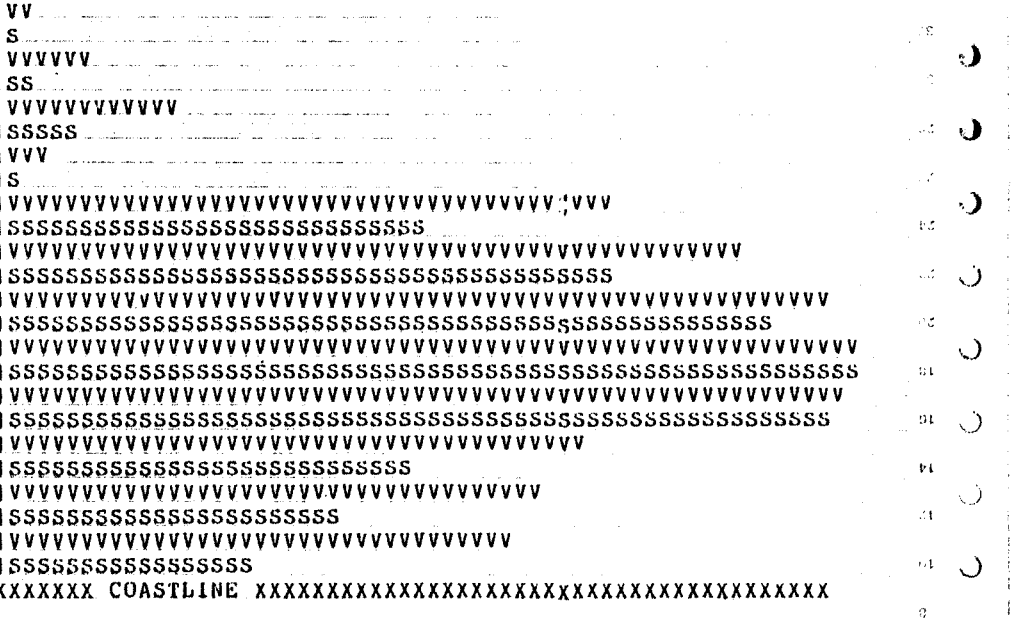
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 25
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .23% OF THE YEAR

REFRACTED WAVEHEIGHT 4.52 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.27	.06	1.72	73.40	1.98	.01	131.93	.13	1.	
9.17	.0236	3.33	.07	1.84	72.73	1.94	.01	127.14	.32	3.	
8.33	.0236	3.38	.08	1.98	72.00	1.90	.01	122.03	.59	7.	
7.50	.0040	3.42	.09	2.13	71.20	1.85	.01	116.57	.17	2.	
6.67	.0437	3.43	.09	2.28	70.30	1.81	.01	110.68	2.03	32.	
5.83	.0437	3.38	.10	2.42	69.28	1.77	.01	104.28	2.46	47.	
5.00	.0437	3.25	.13	2.53	68.14	1.73	.01	97.48	2.75	60.	
4.17	.0437	3.00	.20	2.55	66.88	1.69	.01	90.39	2.86	66.	
3.33	.0437	2.61	.32	2.44	65.50	1.67	.01	83.15	2.81	64.	
2.50	.0272	2.09	.53	2.16	64.03	1.66	.01	75.96	1.92	32.	
1.67	.0272	1.46	.80	1.68	62.43	1.69	.01	68.84	1.80	26.	
.83	.0272	.74	1.10	.97	60.53	1.80	.01	61.18	1.67	19.	



TOTAL TRANSPORT IS 45382. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 8124. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 26
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION -2.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .11% OF THE YEAR

REFRACTED WAVEHEIGHT 4.54 M
BREAKERANGLE -1. DEGREES

D	ALFA	H	SETUP	U1	C	KS1	R	L	V	S	
10.00	.0236	3.29	.06	1.73	73.40	1.98	.01	131.93	-.03	-0.	
9.17	.0236	3.34	.07	1.85	72.73	1.94	.01	127.14	-.07	-0.	
8.33	.0236	3.40	.08	1.99	72.00	1.89	.01	122.03	-.12	-1.	
7.50	.0040	3.43	.09	2.14	71.20	1.85	.01	116.57	-.04	-0.	
6.67	.0437	3.44	.10	2.29	70.30	1.81	.01	110.69	-.52	-3.	
5.83	.0437	3.39	.10	2.43	69.28	1.77	.01	104.29	-.67	-4.	
5.00	.0437	3.26	.13	2.53	68.15	1.73	.01	97.50	-.78	-5.	
4.17	.0437	3.00	.20	2.55	66.89	1.69	.01	90.41	-.81	-6.	
3.33	.0437	2.61	.33	2.44	65.51	1.67	.01	83.18	-.81	-6.	
2.50	.0272	2.09	.53	2.16	64.04	1.66	.01	76.02	-.51	-3.	
1.67	.0272	1.46	.81	1.68	62.45	1.69	.01	68.92	-.51	-3.	
.83	.0272	.74	1.11	.97	60.56	1.81	.01	61.29	-.54	-1.	

TOTAL TRANSPORT IS -4427. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -758. M3/SEASON (ACC TO BIJKER)

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        HYDRONAMIC BV
        PORT & WATERWAY ENGINEERS
        SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  SEDIMENT TRANSPORT IN PROFILE 4
=============================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=   15.00               BREAKERINDEX= .800000
****************************************************************


SEASON NR 27
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  30.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .12% OF THE YEAR
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REFRACTED WAVEHEIGHT 4.46 M
BREAKERANGLE 15. DEGREES

  D    ALFA   H    SETUP   U1   C     KSI     R    L       V       S
10.00 .0236  4.58   .11  2.40 73.44  1.87   .01132.20   .30        2. |VVV
                                                                      |S
 9.17 .0236  4.58   .11  2.53 72.77  1.84   .01127.42   .66        5. |VVVVVVV
                                                                      |S
 8.33 .0236  4.55   .12  2.66 72.04  1.81   .01122.31  1.14        9. |VVVVVVVVVVVVV
                                                                      |SSS
 7.50 .0040  4.47   .12  2.78 71.23  1.78   .01116.81   .33        3. |VVV
                                                                      |S
 6.67 .0437  4.32   .12  2.87 70.32  1.75   .01110.84  3.61       60. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVV
                                                                      |SSSSSSSSSSSSSSSSSSSS
 5.83 .0437  4.08   .10  2.92 69.29  1.72   .01104.31  4.36      104. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 5.00 .0437  3.74   .15  2.90 68.18  1.69   .01 97.68  4.85      149. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0437  3.31   .26  2.79 67.00  1.67   .01 91.03  5.09      173. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0437  2.78   .42  2.56 65.71  1.66   .01 84.20  5.08      166. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0272  2.16   .63  2.20 64.28  1.66   .01 77.17  3.68       58. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.47   .87  1.67 62.64  1.70   .01 69.72  3.40       43. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSS
  .83 .0272   .74  1.11   .97 60.58  1.81   .01 61.37  2.98       29. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     63481. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     17378. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4
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PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                RHO=1027.00                         D90= .001600
              KAPPA=     .38                      DELTA=1.650000
        TEMPERATURE=  15.00                BREAKERINDEX= .800000
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SEASON NR 28
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  24.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .83 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   1.37% OF THE YEAR
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REFRACTED WAVEHEIGHT 4.50 M
BREAKERANGLE 12. DEGREES

   D    ALFA    H    SETUP   U1    C    KSI    R      L     V      S
10.00 .0236  4.66   .11  2.44 73.44  1.87  .01132.22   .24     18. IVVV
                                                                   IS
 9.17 .0236  4.66   .12  2.57 72.78  1.84  .01127.44   .54     45. IVVVVVVV
                                                                   IS
 8.33 .0236  4.62   .12  2.70 72.05  1.81  .01122.33   .97     89. IVVVVVVVVVVVV
                                                                   ISSS
 7.50 .0040  4.53   .12  2.81 71.24  1.78  .01116.83   .28     26. IVVV
                                                                   IS
 6.67 .0437  4.36   .12  2.90 70.33  1.74  .01110.85  3.24    546. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSS
 5.83 .0437  4.11   .11  2.94 69.29  1.71  .01104.32  3.94    904. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 5.00 .0437  3.76   .16  2.92 68.19  1.69  .01 97.74  4.40   1254. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0437  3.32   .27  2.80 67.01  1.67  .01 91.10  4.61   1434. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0437  2.78   .43  2.56 65.73  1.66  .01 84.30  4.60   1365. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0272  2.16   .64  2.19 64.31  1.67  .01 77.29  3.32    513. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.47   .88  1.67 62.67  1.70  .01 69.87  3.07    389. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSSSSSSSS
  .83 .0272   .74  1.13   .97 60.63  1.81  .01 61.54  2.70    271. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   ISSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   607184. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   149798. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

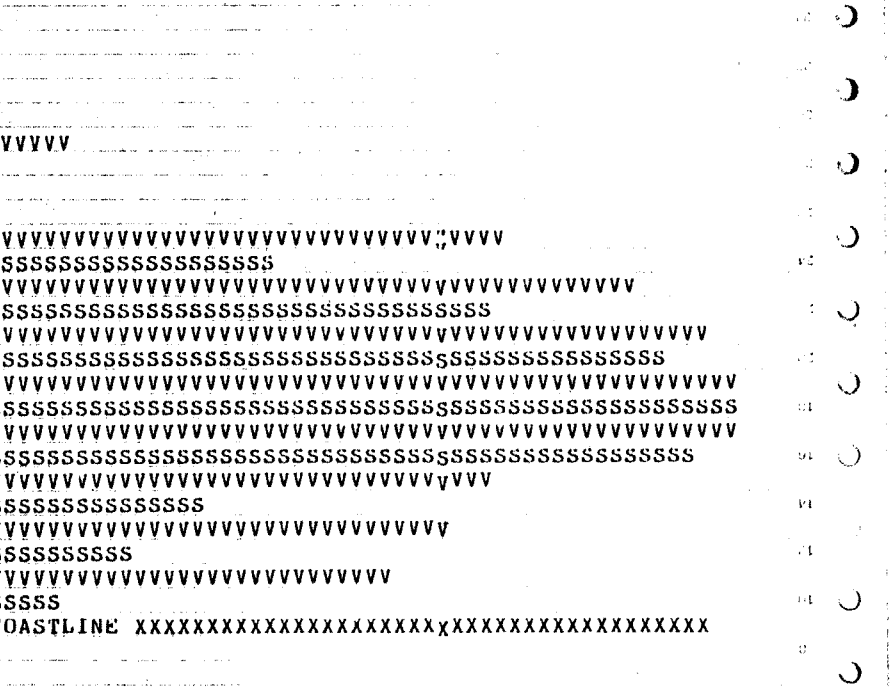
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 29
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF .85 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .43% OF THE YEAR

REFRACTED WAVEHEIGHT 4.68 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	4.72	.11	2.47	73.44	1.87	.01	132.24	.26	6.	
9.17	.0236	4.71	.12	2.60	72.78	1.83	.01	127.46	.54	14.	
8.33	.0236	4.67	.13	2.73	72.05	1.80	.01	122.35	.92	27.	
7.50	.0040	4.57	.13	2.84	71.24	1.77	.01	116.84	.26	8.	
6.67	.0437	4.39	.12	2.92	70.33	1.74	.01	110.87	2.97	145.	
5.83	.0437	4.13	.11	2.96	69.29	1.71	.01	104.34	3.56	221.	
5.00	.0437	3.78	.18	2.92	68.23	1.69	.01	97.97	3.92	285.	
4.17	.0437	3.33	.30	2.79	67.07	1.67	.01	91.41	4.08	312.	
3.33	.0437	2.79	.47	2.55	65.81	1.66	.01	84.70	4.06	292.	
2.50	.0272	2.16	.68	2.18	64.42	1.67	.01	77.81	2.90	120.	
1.67	.0272	1.47	.93	1.65	62.82	1.70	.01	70.52	2.70	93.	
.83	.0272	.74	1.18	.95	60.83	1.82	.01	62.34	2.40	67.	



TOTAL TRANSPORT IS 158087. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 35204. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

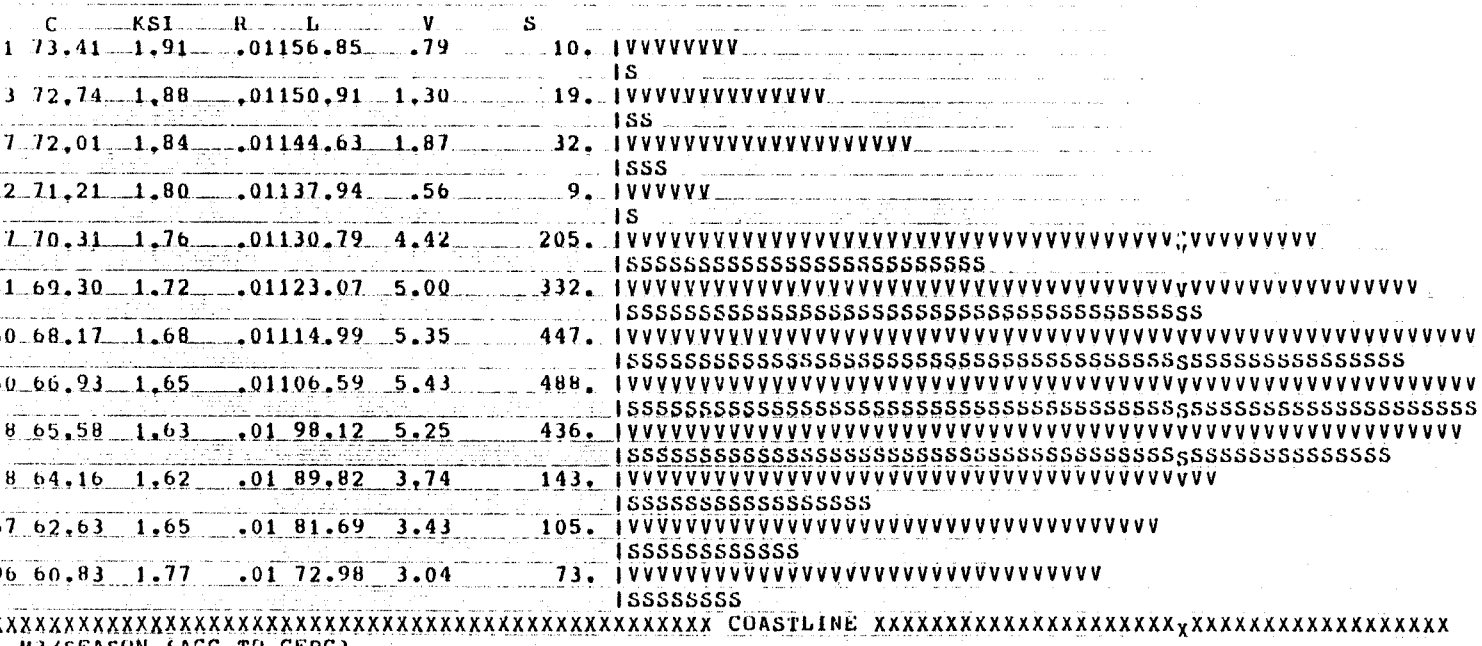
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 30
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 29.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .29% OF THE YEAR

REFRACTED WAVEHEIGHT 4.79 M
BREAKERANGLE 14. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.34	.06	1.81	73.41	1.91	.01	156.85	.79	10.	
9.17	.0236	3.40	.07	1.93	72.74	1.88	.01	150.91	1.30	19.	
8.33	.0236	3.45	.08	2.07	72.01	1.84	.01	144.63	1.87	32.	
7.50	.0040	3.49	.09	2.22	71.21	1.80	.01	137.94	.56	9.	
6.67	.0437	3.50	.10	2.37	70.31	1.76	.01	130.79	4.42	205.	
5.83	.0437	3.45	.11	2.51	69.30	1.72	.01	123.07	5.00	332.	
5.00	.0437	3.30	.15	2.60	68.17	1.68	.01	114.99	5.35	447.	
4.17	.0437	3.04	.22	2.60	66.93	1.65	.01	106.59	5.43	488.	
3.33	.0437	2.64	.36	2.48	65.58	1.63	.01	98.12	5.25	436.	
2.50	.0272	2.11	.58	2.18	64.16	1.62	.01	89.82	3.74	143.	
1.67	.0272	1.46	.87	1.67	62.63	1.65	.01	81.69	3.43	105.	
.83	.0272	.74	1.18	.96	60.83	1.77	.01	72.98	3.04	73.	



TOTAL TRANSPORT IS 167847. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 49566. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

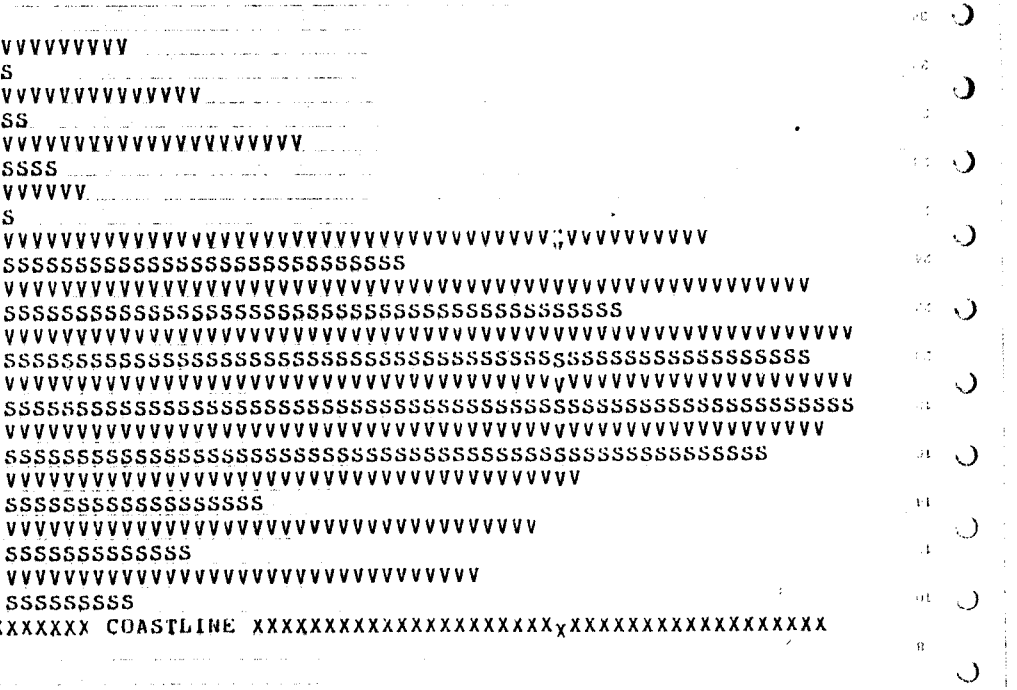
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 31
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 24.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.27 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.05% OF THE YEAR

REFRACTED WAVEHEIGHT 4.91 M
BREAKERANGLE 12. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.40	.06	1.84	73.41	1.91	.01	156.86	.76	69.	
9.17	.0236	3.45	.07	1.97	72.74	1.87	.01	150.93	1.24	129.	
8.33	.0236	3.51	.08	2.11	72.01	1.83	.01	144.65	1.79	217.	
7.50	.0040	3.55	.09	2.26	71.21	1.79	.01	137.97	.53	57.	
6.67	.0437	3.55	.10	2.41	70.31	1.75	.01	130.81	4.19	1256.	
5.83	.0437	3.49	.12	2.54	69.30	1.71	.01	123.13	4.72	1940.	
5.00	.0437	3.33	.16	2.62	68.19	1.68	.01	115.08	5.01	2519.	
4.17	.0437	3.06	.24	2.62	66.95	1.65	.01	106.73	5.05	2683.	
3.33	.0437	2.65	.38	2.48	65.62	1.63	.01	98.34	4.87	2372.	
2.50	.0272	2.11	.60	2.17	64.22	1.63	.01	90.16	3.45	823.	
1.67	.0272	1.46	.90	1.67	62.72	1.66	.01	82.16	3.17	616.	
.83	.0272	.74	1.21	.95	60.97	1.77	.01	73.60	2.83	440.	



TOTAL TRANSPORT IS 1056305. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 285253. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

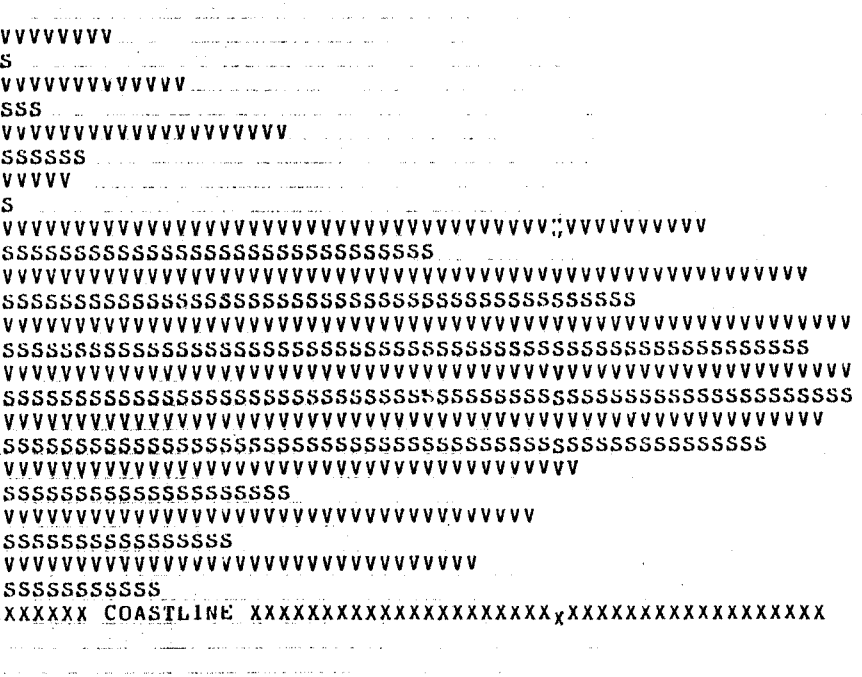
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 32
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .64% OF THE YEAR

REFRACTED WAVEHEIGHT 4.95 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0236	3.45	.07	1.87	73.41	1.90	.01	156.87	.59	17.	
9.17	.0236	3.51	.08	2.00	72.74	1.87	.01	150.94	1.00	32.	
8.33	.0236	3.56	.09	2.14	72.01	1.83	.01	144.67	1.48	53.	
7.50	.0040	3.59	.10	2.29	71.21	1.79	.01	137.99	.42	14.	
6.67	.0437	3.59	.11	2.43	70.31	1.75	.01	130.83	3.62	269.	
5.83	.0437	3.52	.12	2.56	69.31	1.71	.01	123.16	4.09	396.	
5.00	.0437	3.36	.16	2.64	68.19	1.68	.01	115.12	4.35	500.	
4.17	.0437	3.07	.24	2.63	66.96	1.65	.01	106.78	4.38	528.	
3.33	.0437	2.66	.39	2.49	65.63	1.63	.01	98.41	4.22	469.	
2.50	.0272	2.11	.61	2.17	64.24	1.63	.01	90.27	2.96	183.	
1.67	.0272	1.46	.91	1.66	62.75	1.66	.01	82.31	2.74	141.	
.83	.0272	.74	1.22	.95	61.01	1.78	.01	73.79	2.47	104.	



TOTAL TRANSPORT IS 256742. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 59838. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4
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PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00                 BREAKERINDEX= .800000
***********************************************************

SEASON NR 33
 WAVEHEIGHT   4.50 M (HRMS IN DEEP WATER)
 PERIOD      14.00 SEC
 DIRECTION   24.00 DEGREES (AT 10.M DEPTH)
 REFR COEF     .86 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .68% OF THE YEAR
***********************************************************


REFRACTED WAVEHEIGHT 5.00 M
BREAKERANGLE 12. DEGREES

  D    ALFA   H   SETUP  U1    C    KSI   R     L      V         S
10.00 .0236  4.93   .13 2.66 73.46  1.80  .01157.31   .62       26. |VVVVVVV
                                                                    |S
 9.17 .0236  4.92   .14 2.79 72.79  1.77  .01151.39  1.06       48. |VVVVVVVVVVVVV
                                                                    |SSS
 8.33 .0236  4.86   .14 2.90 72.06  1.75  .01145.10  1.58       82. |VVVVVVVVVVVVVVVVVVV
                                                                    |SSSSS
 7.50 .0040  4.73   .14 3.00 71.25  1.72  .01138.35   .44       21. |VVVVV
                                                                    |S
 6.67 .0437  4.53   .13 3.06 70.34  1.69  .01131.06  4.09      493. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV;VVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 5.83 .0437  4.24   .15 3.08 69.35  1.67  .01123.47  4.64      734. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 5.00 .0437  3.86   .23 3.01 68.30  1.65  .01115.90  4.96      912. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0437  3.38   .36 2.85 67.17  1.63  .01108.18  5.06      952. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0437  2.82   .54 2.58 65.95  1.63  .01100.36  4.96      850. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0272  2.18   .76 2.19 64.61  1.63  .01 92.38  3.56      294. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSS
 1.67 .0272  1.48  1.02 1.64 63.08  1.67  .01 84.01  3.29      219. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSS
  .83 .0272   .74  1.27  .94 61.19  1.79  .01 74.65  2.90      152. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   358793. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   103850. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * SEDIMENT TRANSPORT IN PROFILE 4

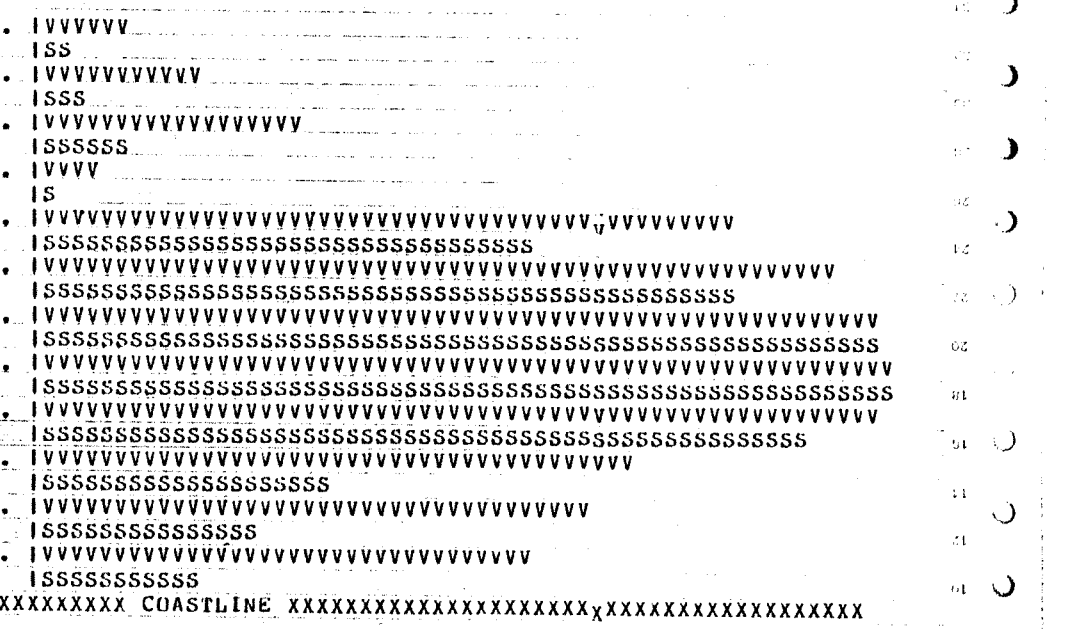
PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 34
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD : 14.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF .86 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

REFRACTED WAVEHEIGHT 4.96 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	01	C	KSI	R	L	V	S	
10.00	.0236	5.00	.13	2.70	73.46	1.80	.01	157.33	.51	7.	
9.17	.0236	4.98	.14	2.82	72.80	1.77	.01	151.42	.87	12.	
8.33	.0236	4.91	.14	2.93	72.07	1.74	.01	145.12	1.33	21.	
7.50	.0040	4.77	.14	3.03	71.26	1.72	.01	138.37	.36	5.	
6.67	.0437	4.56	.13	3.09	70.35	1.69	.01	131.07	3.56	108.	
5.83	.0437	4.27	.15	3.10	69.34	1.66	.01	123.44	4.04	153.	
5.00	.0437	3.88	.23	3.03	68.29	1.65	.01	115.84	4.32	184.	
4.17	.0437	3.39	.36	2.86	67.16	1.63	.01	108.10	4.40	188.	
3.33	.0437	2.82	.53	2.59	65.93	1.62	.01	100.25	4.30	167.	
2.50	.0272	2.18	.75	2.19	64.58	1.63	.01	92.24	3.06	64.	
1.67	.0272	1.48	1.00	1.65	63.05	1.67	.01	83.83	2.83	49.	
.83	.0272	.74	1.26	.94	61.15	1.78	.01	74.44	2.51	35.	



TOTAL TRANSPORT IS 92093. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 21873. M3/SEASON (ACC TO BIJKER)

TOTAL TRANSPORT 2777038.M3/YEAR
NEGAT TRANSPORT -1919.M3/YEAR
POSIT TRANSPORT 2779557.M3/YEAR
DOMINANT NEGAT WAVE DIRECTION -1.
DOMINANT POSIT WAVE DIRECTION 10.

Calculated transport in profile 2
(with influence of set-up difference)

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      HYDRONAMIC BV
      PORT & WATERWAY ENGINEERS
      SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
========================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                     DELTA=1.650000
          TEMPERATURE=  15.00              BREAKERINDEX= .800000
************************************************************


SEASON NR  1
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  28.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .17% OF THE YEAR
************************************************************


A SETUP DIFFERENCE DISTANCE OF    750M IS USED


REFRACTED WAVEHEIGHT 1.35 M
BREAKERANGLE 10. DEGREES

  D     ALFA'  H    SETUP   U1   C    KSI    R    L       V       S
10.00 .0246   .90   .00   .41 73.36  2.87  .01 80.08  -.09      -0. |VV
                                                                    |S
 9.17 .0246   .91   .00   .44 72.68  2.79  .01 77.76  -.09      -0. |VV
                                                                    |S
 8.33 .0246   .93   .00   .48 71.94  2.70  .01 75.19  -.08      -0. |VV
                                                                    |S
 7.50 .0246   .94   .01   .53 71.12  2.61  .01 72.33  -.08      -0. |VV
                                                                    |S
 6.67 .0246   .96   .01   .59 70.20  2.52  .01 69.15  -.07      -0. |VV
                                                                    |S
 5.83 .0075   .99   .01   .66 69.16  2.42  .01 65.57  -.02      -0. |V
                                                                    |S
 5.00 .0075  1.02   .01   .75 67.96  2.32  .01 61.55  -.02      -0. |V
                                                                    |S
 4.17 .0075  1.05   .01   .87 66.55  2.20  .01 56.97  -.02      -0. |V
                                                                    |S
 3.33 .0160  1.11   .02  1.04 64.82  2.06  .01 51.69  -.01      -0. |V
                                                                    |S
 2.50 .0667  1.16   .03  1.27 62.62  1.92  .01 45.47   .61       4. |VVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSS
 1.67 .0667  1.10   .04  1.50 59.53  1.77  .01 37.77  1.90      22. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .70   .14  1.29 55.20  1.69  .01 28.94  1.99      25. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     2938. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      610. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

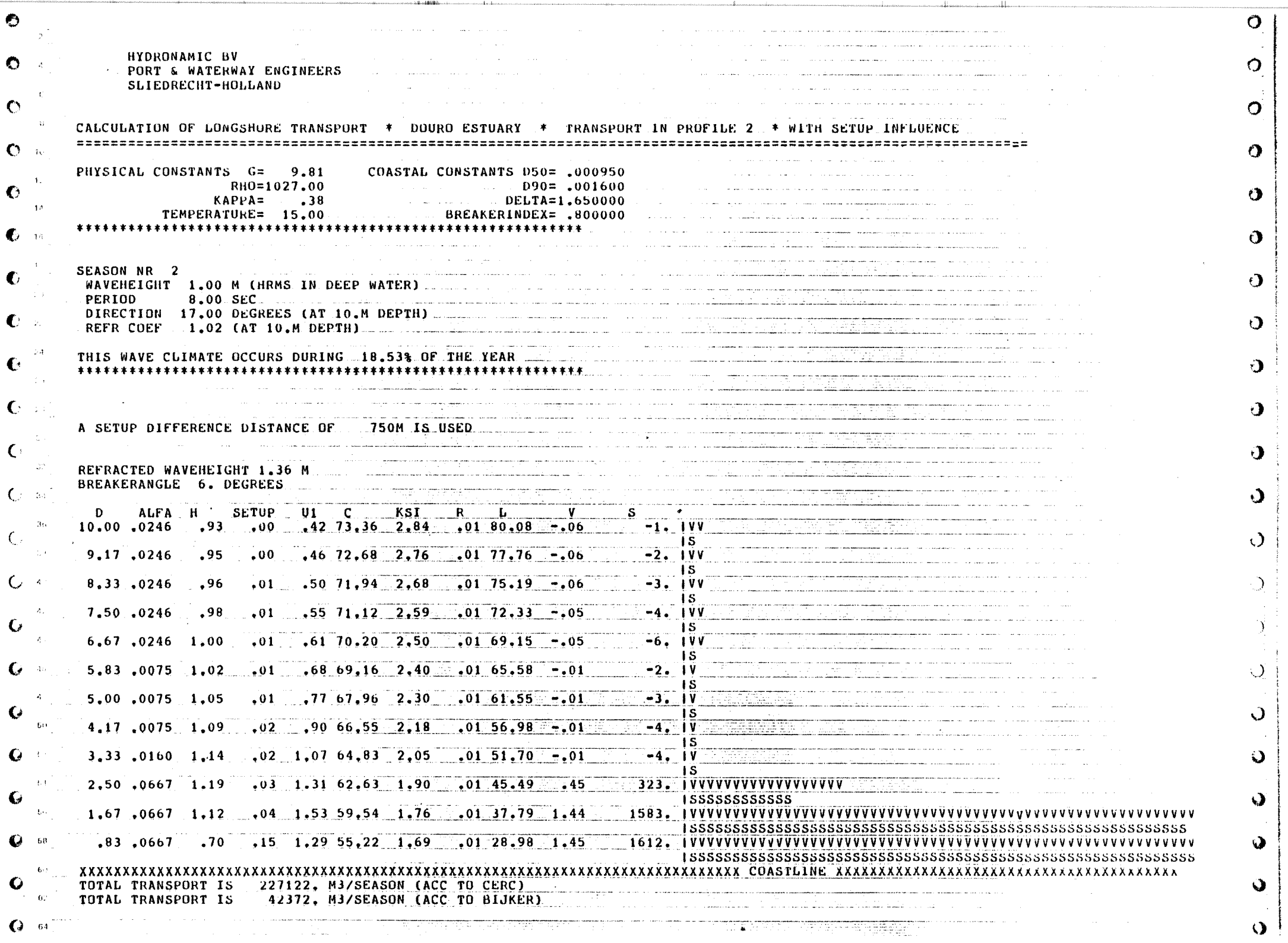
SEASON NR 2
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 17.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 18.53% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.36 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.93	.00	.42	73.36	2.84	.01	80.08	-.06	-1.	
9.17	.0246	.95	.00	.46	72.68	2.76	.01	77.76	-.06	-2.	
8.33	.0246	.96	.01	.50	71.94	2.68	.01	75.19	-.06	-3.	
7.50	.0246	.98	.01	.55	71.12	2.59	.01	72.33	-.05	-4.	
6.67	.0246	1.00	.01	.61	70.20	2.50	.01	69.15	-.05	-6.	
5.83	.0075	1.02	.01	.68	69.16	2.40	.01	65.58	-.01	-2.	
5.00	.0075	1.05	.01	.77	67.96	2.30	.01	61.55	-.01	-3.	
4.17	.0075	1.09	.02	.90	66.55	2.18	.01	56.98	-.01	-4.	
3.33	.0160	1.14	.02	1.07	64.83	2.05	.01	51.70	-.01	-4.	
2.50	.0667	1.19	.03	1.31	62.63	1.90	.01	45.49	.45	323.	
1.67	.0667	1.12	.04	1.53	59.54	1.76	.01	37.79	1.44	1583.	
.83	.0667	.70	.15	1.29	55.22	1.69	.01	28.98	1.45	1612.	



TOTAL TRANSPORT IS 227122. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 42372. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 3
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 6.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .77% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.38 M
BREAKERANGLE 2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.95	.00	.43	73.36	2.83	.01	80.08	-.02	-0.	IVV
											IS
9.17	.0246	.96	.00	.47	72.68	2.75	.01	77.76	-.02	-0.	IVV
											IS
8.33	.0246	.98	.01	.51	71.94	2.67	.01	75.19	-.02	-0.	IVV
											IS
7.50	.0246	.99	.01	.56	71.12	2.58	.01	72.33	-.02	-0.	IVV
											IS
6.67	.0246	1.01	.01	.62	70.20	2.49	.01	69.15	-.02	-0.	IV
											IS
5.83	.0075	1.04	.01	.69	69.16	2.40	.01	65.58	-.01	-0.	IV
											IS
5.00	.0075	1.07	.01	.79	67.96	2.29	.01	61.56	-.00	-0.	IV
											IS
4.17	.0075	1.11	.02	.91	66.55	2.17	.01	56.98	-.00	-0.	IV
											IS
3.33	.0160	1.16	.02	1.09	64.83	2.04	.01	51.70	-.02	-0.	IV
											IS
2.50	.0667	1.21	.03	1.33	62.63	1.90	.01	45.49	.09	3.	IVVVVVVVVVV
											ISSSSSSS
1.67	.0667	1.12	.04	1.54	59.55	1.76	.01	37.81	.56	21.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.71	.15	1.29	55.26	1.69	.01	29.05	.47	15.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 3509. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 449. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950

PHYSICAL CONSTANTS G=	9.81	COASTAL CONSTANTS D50=	.000950
RHO=	1027.00	D90=	.001600
KAPPA=	.38	DELTA=	1.650000
TEMPERATURE=	15.00	BREAKERINDEX=	.800000

****

SEASON NR 4
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION -5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .51% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.39 M
BREAKERANGLE -2. DEGREES

```
   D    ALFA    H   SETUP   U1    C     KSI     R     L       V        S
10.00 .0246   .95   .00    .43 73.36  2.83   .01  80.08   .02       0. |V
                                                                       |S
 9.17 .0246   .96   .00    .47 72.68  2.75   .01  77.76   .02       0. |V
                                                                       |S
 8.33 .0246   .98   .01    .51 71.94  2.67   .01  75.19   .02       0. |V
                                                                       |S
 7.50 .0246   .99   .01    .56 71.12  2.58   .01  72.33   .02       0. |V
                                                                       |S
 6.67 .0246  1.01   .01    .62 70.20  2.49   .01  69.15   .01       0. |V
                                                                       |S
 5.83 .0075  1.04   .01    .69 69.16  2.40   .01  65.58   .00       0. |V
                                                                       |S
 5.00 .0075  1.07   .01    .79 67.96  2.29   .01  61.56   .00       0. |V
                                                                       |S
 4.17 .0075  1.11   .02    .91 66.55  2.17   .01  56.98   .00       0. |V
                                                                       |S
 3.33 .0160  1.16   .02   1.09 64.83  2.04   .01  51.70  -.02      -0. |V
                                                                       |S
 2.50 .0667  1.21   .03   1.33 62.63  1.90   .01  45.49  -.34      -7. |VVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSS
 1.67 .0667  1.13   .04   1.54 59.55  1.76   .01  37.81  -.76     -19. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .71   .15   1.29 55.26  1.69   .01  29.05  -.98     -25. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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TOTAL TRANSPORT IS -1941. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -642. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

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PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
               RHO=1027.00                         D90= .001600
             KAPPA=     .38                      DELTA=1.650000
       TEMPERATURE=   15.00               BREAKERINDEX= .800000
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SEASON NR 5
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION -18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.02 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .24% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.36 M
BREAKERANGLE -7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.93	.00	.42	73.36	2.84	.01	80.08	.06	0.	IVV IS
9.17	.0246	.94	.00	.46	72.68	2.76	.01	77.76	.06	0.	IV IS
8.33	.0246	.96	.01	.50	71.94	2.68	.01	75.19	.06	0.	IV IS
7.50	.0246	.97	.01	.55	71.12	2.60	.01	72.33	.05	0.	IV IS
6.67	.0246	.99	.01	.61	70.20	2.50	.01	69.15	.05	0.	IV IS
5.83	.0075	1.02	.01	.68	69.16	2.41	.01	65.58	.01	0.	IV IS
5.00	.0075	1.05	.01	.77	67.96	2.30	.01	61.55	.01	0.	IV IS
4.17	.0075	1.09	.02	.90	66.55	2.18	.01	56.97	.01	0.	IV IS
3.33	.0160	1.14	.02	1.07	64.83	2.05	.01	51.70	-.01	-0.	IV IS
2.50	.0667	1.19	.03	1.31	62.63	1.91	.01	45.48	-.69	-7.	IVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSS
1.67	.0667	1.11	.04	1.52	59.54	1.76	.01	37.79	-1.67	-25.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.70	.15	1.29	55.22	1.68	.01	28.97	-1.85	-30.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS -3092. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -765. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 6
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 16.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.01 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 3.33 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	2.82	.03	1.27	73.38	2.25	.01	80.16	-.18	-4.	IVVV IS
9.17	.0246	2.85	.04	1.38	72.71	2.19	.01	77.86	-.13	-3.	IVV IS
8.33	.0246	2.88	.04	1.49	71.97	2.14	.01	75.32	-.05	-1.	IV IS
7.50	.0246	2.91	.05	1.63	71.16	2.08	.01	72.50	-.12	-4.	IVV IS
6.67	.0246	2.94	.06	1.78	70.26	2.02	.01	69.36	-.07	-2.	IV IS
5.83	.0075	2.93	.07	1.94	69.23	1.96	.01	65.83	-.34	-12.	IVVVVVV ISSS
5.00	.0075	2.87	.07	2.10	68.05	1.90	.01	61.85	-.24	-9.	IVVVV ISS
4.17	.0075	2.71	.06	2.22	66.64	1.84	.01	57.26	-.02	-1.	IV IS
3.33	.0160	2.43	.15	2.23	65.11	1.80	.01	52.55	.36	15.	IVVVVVVV ISSSS
2.50	.0667	2.00	.29	2.08	63.40	1.77	.01	47.59	2.95	208.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.42	.51	1.71	61.44	1.78	.01	42.38	2.44	135.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.76	1.05	59.03	1.88	.01	36.63	1.72	66.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 106131. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 2953. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

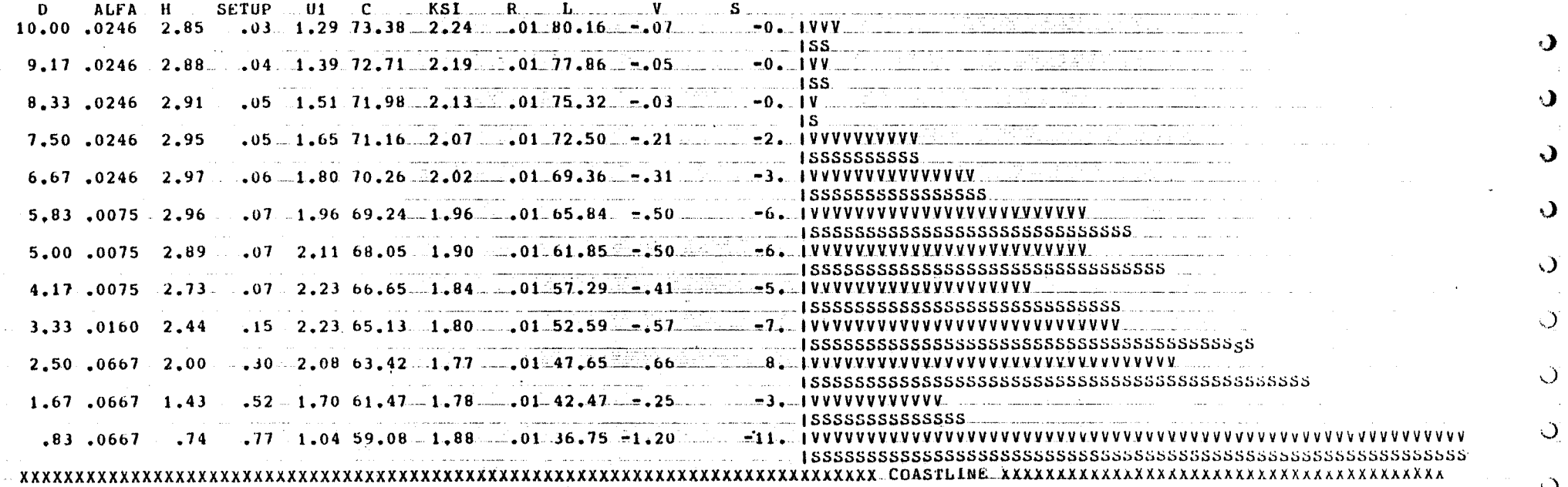
SEASON NR 7
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 6.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.01 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 3.37 M
BREAKERANGLE 3. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	2.85	.03	1.29	73.38	2.24	.01	80.16	-.07	-0.	
9.17	.0246	2.88	.04	1.39	72.71	2.19	.01	77.86	-.05	-0.	
8.33	.0246	2.91	.05	1.51	71.98	2.13	.01	75.32	-.03	-0.	
7.50	.0246	2.95	.05	1.65	71.16	2.07	.01	72.50	-.21	-2.	
6.67	.0246	2.97	.06	1.80	70.26	2.02	.01	69.36	-.31	-3.	
5.83	.0075	2.96	.07	1.96	69.24	1.96	.01	65.84	-.50	-6.	
5.00	.0075	2.89	.07	2.11	68.05	1.90	.01	61.85	-.50	-6.	
4.17	.0075	2.73	.07	2.23	66.65	1.84	.01	57.29	-.41	-5.	
3.33	.0160	2.44	.15	2.23	65.13	1.80	.01	52.59	-.57	-7.	
2.50	.0667	2.00	.30	2.08	63.42	1.77	.01	47.65	-.66	-8.	
1.67	.0667	1.43	.52	1.70	61.47	1.78	.01	42.47	-.25	-3.	
.83	.0667	.74	.77	1.04	59.08	1.88	.01	36.75	-1.20	-11.	



TOTAL TRANSPORT IS 12673. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -2397. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
======================================================================================================

PHYSICAL CONSTANTS  G=   9.81     COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                        D90= .001600
               KAPPA=    .38                      DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
***********************************************************


SEASON NR  8
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  22.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   2.25% OF THE YEAR
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A SETUP DIFFERENCE DISTANCE OF     750M IS USED


REFRACTED WAVEHEIGHT 1.60 M
BREAKERANGLE  7. DEGREES

   D    ALFA   H    SETUP   U1   C    KSI    R    L       V       S
10.00 .0246   .99    .00   .50 73.36  2.60  .01106.30  -.07    -0. |V
                                                                   |S
 9.17 .0246  1.01    .01   .53 72.68  2.54  .01102.66  -.07    -0. |V
                                                                   |S
 8.33 .0246  1.02    .01   .58 71.94  2.47  .01 98.74  -.06    -1. |V
                                                                   |S
 7.50 .0246  1.05    .01   .63 71.12  2.40  .01 94.48  -.06    -1. |V
                                                                   |S
 6.67 .0246  1.07    .01   .70 70.20  2.32  .01 89.85  -.06    -1. |V
                                                                   |S
 5.83 .0075  1.10    .01   .78 69.16  2.23  .01 84.78  -.02    -0. |V
                                                                   |S
 5.00 .0075  1.14    .01   .88 67.97  2.14  .01 79.18  -.01    -0. |V
                                                                   |S
 4.17 .0075  1.19    .02  1.01 66.56  2.04  .01 72.94  -.00    -0. |V
                                                                   |S
 3.33 .0160  1.25    .03  1.20 64.84  1.92  .01 65.88  -.02    -1. |V
                                                                   |S
 2.50 .0667  1.29    .04  1.44 62.65  1.80  .01 57.72  1.30   147. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.17    .05  1.61 59.62  1.68  .01 47.91  2.16   355. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .71    .19  1.29 55.58  1.63  .01 37.24  1.86   281. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     45931. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      9509. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 RHO=1027.00 KAPPA= .38 TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950 D90= .001600 DELTA=1.650000 BREAKERINDEX= .800000

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SEASON NR 9
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 23.34% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.64 M
BREAKER ANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.01	.01	.51	73.36	2.59	.01	106.30	-.04	-2.	IV IS
9.17	.0246	1.03	.01	.55	72.68	2.52	.01	102.66	-.04	-3.	IV IS
8.33	.0246	1.05	.01	.59	71.94	2.45	.01	98.74	-.03	-3.	IV IS
7.50	.0246	1.07	.01	.65	71.12	2.38	.01	94.49	-.03	-5.	IV IS
6.67	.0246	1.10	.01	.71	70.20	2.30	.01	89.85	-.03	-6.	IV IS
5.83	.0075	1.13	.01	.80	69.16	2.22	.01	84.78	-.01	-2.	IV IS
5.00	.0077	1.17	.02	.90	67.97	2.13	.01	79.19	-.01	-3.	IV IS
4.17	.0075	1.22	.02	1.04	66.56	2.03	.01	72.95	-.00	-1.	IV IS
3.33	.0160	1.28	.03	1.23	64.84	1.91	.01	65.90	-.07	-52.	IVVV IS
2.50	.0667	1.31	.04	1.47	62.65	1.79	.01	57.74	.75	773.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.06	1.63	59.63	1.67	.01	47.95	1.35	1833.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.20	1.29	55.64	1.63	.01	37.39	1.06	1227.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 256937. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 43907. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

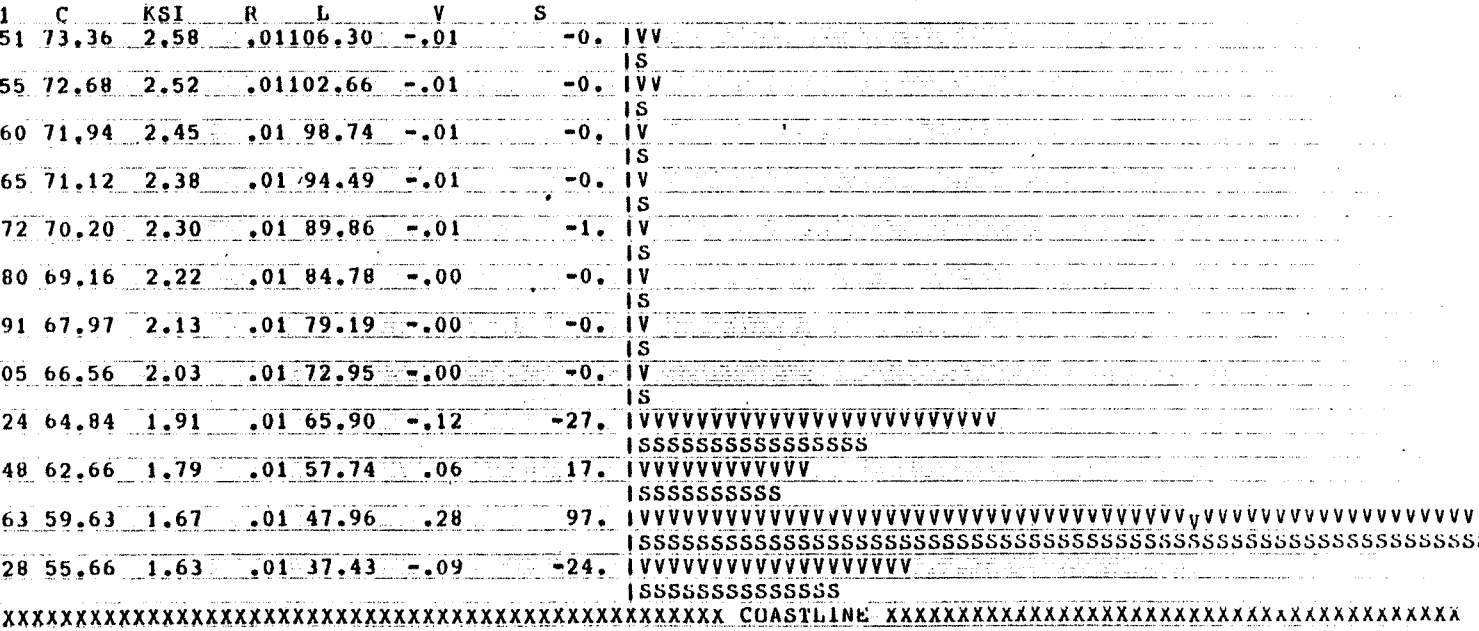
SEASON NR 10
WAVEHEIGHT 1.0 M (HRMS IN DEEP WATER)
PERIOD 10.0 SEC
DIRECTION 3.0 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 7.26% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.65 M
BREAKERANGLE 1. DEGREES

D	AL/A	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0276	1.02	.01	.51	73.36	2.58	.01	106.30	-.01	-0.	
9.17	.0246	1.04	.01	.55	72.68	2.52	.01	102.66	-.01	-0.	
8.33	.0246	1.06	.01	.60	71.94	2.45	.01	98.74	-.01	-0.	
7.50	.0246	1.08	.01	.65	71.12	2.38	.01	94.49	-.01	-0.	
6.67	.0246	1.11	.01	.72	70.20	2.30	.01	89.86	-.01	-1.	
5.83	.0075	1.14	.01	.80	69.16	2.22	.01	84.78	-.00	-0.	
5.00	.0075	1.18	.02	.91	67.97	2.13	.01	79.19	-.00	-0.	
4.17	.0075	1.23	.02	1.05	66.56	2.03	.01	72.95	-.00	-0.	
3.33	.0160	1.29	.03	1.24	64.84	1.91	.01	65.90	-.12	-27.	
2.50	.0667	1.32	.04	1.48	62.66	1.79	.01	57.74	.06	17.	
1.67	.0667	1.18	.06	1.63	59.63	1.67	.01	47.96	.28	97.	
.83	.0667	.72	.20	1.28	55.66	1.63	.01	37.43	-.09	-24.	



TOTAL TRANSPORT IS 22304. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -382. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 11
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .64% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.65 M
BREAKERANGLE -2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.02	.01	.51	73.36	2.58	.01	106.30	.02	0.	IV IS
9.17	.0246	1.04	.01	.55	72.68	2.52	.01	102.66	.02	0.	IV IS
8.33	.0246	1.06	.01	.60	71.94	2.45	.01	98.74	.02	0.	IV IS
7.50	.0246	1.08	.01	.65	71.12	2.38	.01	94.49	.02	0.	IV IS
6.67	.0246	1.11	.01	.72	70.20	2.30	.01	89.86	.01	0.	IV IS
5.83	.0075	1.14	.01	.80	69.16	2.22	.01	84.78	.00	0.	IV IS
5.00	.0075	1.18	.02	.91	67.97	2.13	.01	79.19	.00	0.	IV IS
4.17	.0075	1.23	.02	1.05	66.56	2.03	.01	72.95	.00	0.	IV IS
3.33	.0160	1.29	.03	1.24	64.84	1.91	.01	65.90	-.16	-3.	IVVVVVVVV ISSSS
2.50	.0667	1.32	.04	1.48	62.66	1.79	.01	57.74	-.68	-19.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.06	1.63	59.63	1.67	.01	47.96	-1.02	-35.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.20	1.28	55.66	1.63	.01	37.42	-1.16	-39.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS -3266. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1310. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

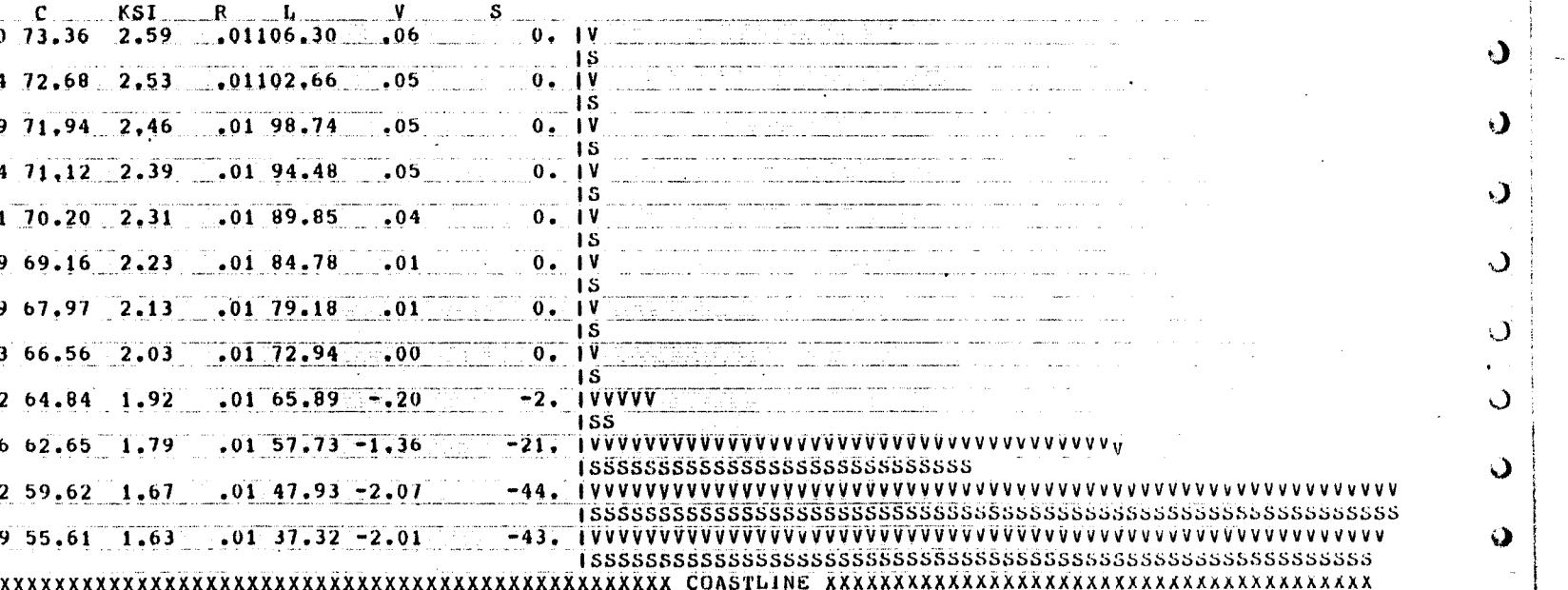
SEASON NR 12
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -17.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .30% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.62 M
BREAKERANGLE -6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.00	.01	.50	73.36	2.59	.01	106.30	.06	0.	
9.17	.0246	1.02	.01	.54	72.68	2.53	.01	102.66	.05	0.	
8.33	.0246	1.04	.01	.59	71.94	2.46	.01	98.74	.05	0.	
7.50	.0246	1.06	.01	.64	71.12	2.39	.01	94.48	.05	0.	
6.67	.0246	1.09	.01	.71	70.20	2.31	.01	89.85	.04	0.	
5.83	.0075	1.12	.01	.79	69.16	2.23	.01	84.78	.01	0.	
5.00	.0015	1.16	.02	.89	67.97	2.13	.01	79.18	.01	0.	
4.17	.0075	1.20	.02	1.03	66.56	2.03	.01	72.94	.00	0.	
3.33	.0160	1.26	.03	1.22	64.84	1.92	.01	65.89	-.20	-2.	
2.50	.0667	1.30	.04	1.46	62.65	1.79	.01	57.73	-1.36	-21.	
1.67	.0667	1.18	.06	1.62	59.62	1.67	.01	47.93	-2.07	-44.	
.83	.0667	.71	.20	1.29	55.61	1.63	.01	37.32	-2.01	-43.	



TOTAL TRANSPORT IS -4930. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1422. M3/SEASON (ACC TO BIJKER)

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     HYDRONAMIC BV
     PORT & WATERWAY ENGINEERS
     SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
==========================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                RHO=1027.00                           D90= .001600
              KAPPA=     .38                        DELTA=1.650000
        TEMPERATURE=   15.00                BREAKERINDEX= .800000
************************************************************

SEASON NR 13
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  22.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .69% OF THE YEAR
************************************************************


A SETUP DIFFERENCE DISTANCE OF   750M IS USED

REFRACTED WAVEHEIGHT 3.88 M
BREAKERANGLE .!. DEGREES

  D    ALFA   H    SETUP   U1   C     KSI     R    L        V        S
10.00 .0246  7.98   .04  1.49 73.39  2.09   .01106.46  -.11       -3. IV
                                                                      IS
 9.17 .0246  3.03   .05  1.60 72.72  2.05   .01102.87  -.11       -3. IV
                                                                      IS
 8.33 .0246  3.07   .06  1.73 71.99  2.00   .01 98.99  -.08       -2. IV
                                                                      IS
 7.50 .0246  3.12   .07  1.87 71.18  1.95   .01 94.80   .13        4. IV
                                                                      IS
 6.67 .0246  3.14   .08  2.03 70.28  1.90   .01 90.24   .56       20. IVVVVVVVV
                                                                      ISS
 5.83 .0073  3.13   .08  2.19 69.26  1.85   .01 85.23  -.25       -9. IVVV
                                                                      IS
 5.00 .0075  3.05   .08  2.32 68.07  1.80   .01 79.67  -.00       -0. IV
                                                                      IS
 4.17 .00!!  2.85   .13  2.40 66.76  1.76   .01 73.81  -.09       -4. IV
                                                                      IS
 3.33 .0160  2.52   .23  2.35 65.30  1.72   .01 67.72   .73       32. IVVVVVVVVVV
                                                                      ISSSS
 2.50 .0667  2.05   .40  2.14 63.70  1.71   .01 61.51  4.06      447. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.44   .64  1.70 61.92  1.72   .01 55.19  3.38      257. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0657   .74   .92  1.01 59.76  1.83   .01 48.34  2.54      126. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSS
XXXXXXXXX(XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    188998. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     11176. M3/SEASON (ACC TO BIJKER)
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HYDRODYNAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

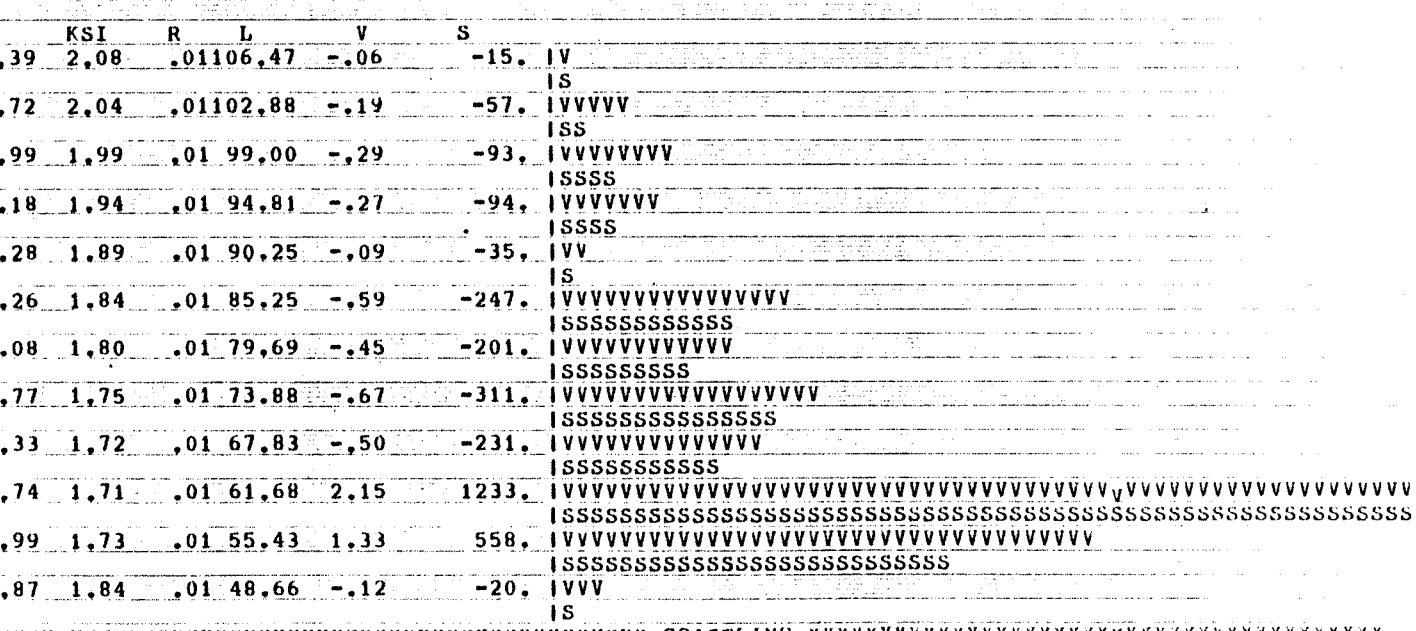
SEASON NR 14
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 7.35% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 3.97 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.05	.05	1.52	73.39	2.08	.01	106.47	-.06	-15.	
9.17	.0246	3.09	.05	1.64	72.72	2.04	.01	102.88	-.19	-57.	
8.33	.0246	3.14	.06	1.77	71.99	1.99	.01	99.00	-.29	-93.	
7.50	.0246	3.18	.07	1.91	71.18	1.94	.01	94.81	-.27	-94.	
6.67	.0246	3.20	.08	2.07	70.28	1.89	.01	90.25	-.09	-35.	
5.83	.0075	3.18	.09	2.22	69.26	1.84	.01	85.25	-.59	-247.	
5.00	.0075	3.08	.09	2.35	68.08	1.80	.01	79.69	-.45	-201.	
4.17	.0075	2.88	.14	2.41	66.77	1.75	.01	73.88	-.67	-311.	
3.33	.0160	2.54	.24	2.36	65.33	1.72	.01	67.83	-.50	-231.	
2.50	.0667	2.06	.42	2.14	63.74	1.71	.01	61.68	2.15	1233.	
1.67	.0667	1.45	.67	1.70	61.99	1.73	.01	55.43	1.33	558.	
.83	.0667	.74	.94	1.01	59.87	1.84	.01	48.66	-.12	-20.	



TOTAL TRANSPORT IS 1085674. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -76340. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 15
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 3.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.35% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 3.99 M
BREAKERANGLE 2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.07	.05	1.53	73.39	2.08	.01	106.47	-.02	-1.	IV
											IS
9.17	.0246	3.11	.05	1.65	72.72	2.04	.01	102.88	-.24	-22.	IVVVVVV
											ISSS
8.33	.0246	3.16	.06	1.78	71.99	1.99	.01	99.01	-.44	-46.	IVVVVVVVVVVV
											ISSSSSSS
7.50	.0246	3.20	.07	1.92	71.18	1.94	.01	94.82	-.58	-67.	IVVVVVVVVVVVVVVV
											ISSSSSSSSSSS
6.67	.0246	3.22	.08	2.08	70.28	1.89	.01	90.26	-.65	-82.	IVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSS
5.83	.0075	3.19	.09	2.23	69.26	1.84	.01	85.25	-.85	-116.	IVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSS
5.00	.0075	3.09	.09	2.36	68.08	1.79	.01	79.69	-.80	-117.	IVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSS
4.17	.0075	2.89	.14	2.42	66.78	1.75	.01	73.90	-1.06	-166.	IVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0160	2.54	.25	2.36	65.34	1.72	.01	67.87	-1.35	-219.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0667	2.06	.43	2.14	63.76	1.71	.01	61.73	-1.11	-163.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.45	.67	1.70	62.01	1.73	.01	55.50	-1.84	-281.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.95	1.00	59.90	1.84	.01	48.76	-2.29	-351.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 96851. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -68793. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

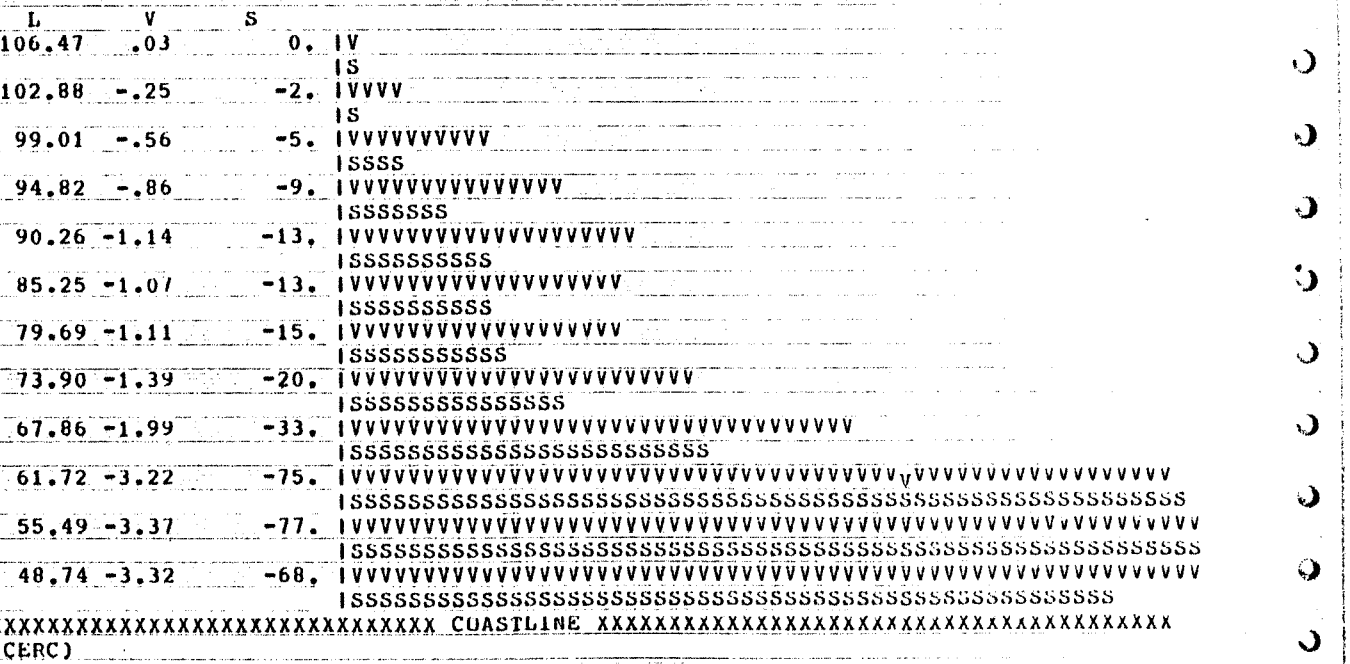
SEASON NR 16
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 3.99 M
BREAKERANGLE -3. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.06	.05	1.53	73.39	2.08	.01	106.47	.03	0.	
9.17	.0246	3.11	.05	1.65	72.72	2.04	.01	102.88	-.25	-2.	
8.33	.0246	3.15	.06	1.77	71.99	1.99	.01	99.01	-.56	-5.	
7.50	.0246	3.19	.07	1.92	71.18	1.94	.01	94.82	-.86	-9.	
6.67	.0246	3.22	.08	2.07	70.28	1.89	.01	90.26	-1.14	-13.	
5.83	.0075	3.19	.09	2.23	69.26	1.84	.01	85.25	-1.07	-13.	
5.00	.0075	3.09	.09	2.36	68.08	1.79	.01	79.69	-1.11	-15.	
4.17	.0075	2.88	.14	2.42	66.78	1.75	.01	73.90	-1.39	-20.	
3.33	.0160	2.54	.25	2.36	65.34	1.72	.01	67.86	-1.99	-33.	
2.50	.0667	2.06	.42	2.14	63.75	1.71	.01	61.72	-3.22	-75.	
1.67	.0667	1.45	.67	1.70	62.00	1.73	.01	55.49	-3.37	-77.	
.83	.0667	.74	.95	1.00	59.90	1.84	.01	48.74	-3.32	-68.	



TOTAL TRANSPORT IS -14379. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -10378. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
==============================================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                RHO=1027.00                          D90= .001600
              KAPPA=     .38                       DELTA=1.650000
         TEMPERATURE=  15.00                 BREAKERINDEX= .800000
***********************************************************


SEASON NR 17
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION -17.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.11 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .10% OF THE YEAR
***********************************************************


A SETUP DIFFERENCE DISTANCE OF    750M IS USED


REFRACTED WAVEHEIGHT 3.93 M
BREAKERANGLE -9. DEGREES

  D    ALFA   H    SETUP   U1   C      KSI    R    L        V         S
10.00 .0246  3.02   .05  1.51 73.39  2.09   .01106.47    .09        0. IV
                                                                       IS
 9.17 .0246  3.06   .05  1.62 72.72  2.04   .01102.87   -.23       -1. IVV
                                                                       IS
 8.33 .0246  3.11   .06  1.75 71.99  2.00   .01 99.00   -.67       -3. IVVVVVVVV
                                                                       IS
 7.50 .0246  3.15   .07  1.89 71.18  1.95   .01 94.81  -1.14       -6. IVVVVVVVVVVVVV
                                                                       ISS
 6.67 .0246  3.18   .08  2.05 70.28  1.90   .01 90.25  -1.64      -10. IVVVVVVVVVVVVVVVVVVV
                                                                       ISSSS
 5.83 .0075  3.16   .08  2.20 69.26  1.85   .01 85.24  -1.31       -8. IVVVVVVVVVVVVVVVV
                                                                       ISSSS
 5.00 .0075  3.07   .09  2.34 68.08  1.80   .01 79.68  -1.45      -10. IVVVVVVVVVVVVVVVVV
                                                                       ISSSS
 4.17 .0075  2.87   .13  2.41 66.77  1.75   .01 73.85  -1.75      -13. IVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSS
 3.33 .0160  2.53   .24  2.36 65.32  1.72   .01 67.78  -2.66      -25. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSS
 2.50 .0667  2.05   .41  2.14 63.72  1.71   .01 61.60  -4.91     -119. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.44   .66  1.70 61.95  1.73   .01 55.32  -4.76     -102. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .93  1.01 59.82  1.83   .01 48.52  -4.37      -72. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                       ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   -22049. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS    -8720. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
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PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=   15.00               BREAKERINDEX= .800000
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SEASON NR 18
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .63% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.87 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.07	.01	.57	73.36	2.43	.01	131.64	-.06	-0.	IV IS
9.17	.0246	1.09	.01	.61	72.68	2.37	.01	126.78	-.05	-0.	IV IS
8.33	.0246	1.12	.01	.66	71.94	2.31	.01	121.60	-.05	-0.	IV IS
7.50	.0246	1.14	.01	.72	71.12	2.25	.01	116.05	-.05	-0.	IV IS
6.67	.0246	1.17	.01	.79	70.20	2.18	.01	110.06	-.04	-0.	IV IS
5.83	.0075	1.21	.01	.87	69.17	2.10	.01	103.58	-.01	-0.	IV IS
5.00	.0075	1.25	.02	.99	67.97	2.02	.01	96.50	-.01	-0.	IV IS
4.17	.0075	1.31	.02	1.14	66.56	1.93	.01	88.68	-.07	-1.	IV IS
3.33	.0160	1.37	.03	1.34	64.85	1.83	.01	79.92	.04	1.	IV IS
2.50	.0667	1.39	.05	1.58	62.67	1.71	.01	69.88	1.79	68.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.22	.07	1.68	59.70	1.61	.01	58.08	2.23	105.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.25	1.27	55.98	1.59	.01	45.96	1.71	67.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 14801. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 2905. M3/SEASON (ACC TO BIJKER)

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        HYDRONAMIC BV
        PORT & WATERWAY ENGINEERS
        SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
==========================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00                BREAKERINDEX= .800000
************************************************************


SEASON NR 19
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION   9.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   6.87% OF THE YEAR
************************************************************


A SETUP DIFFERENCE DISTANCE OF     750M IS USED


REFRACTED WAVEHEIGHT 1.91 M
BREAKERANGLE  3. DEGREES

  D    ALFA   H    SETUP   U1    C    KSI    R     L       V      S
10.00 .0246  1.09   .01   .58 73.36  2.42  .01131.64  -.03       -1. |V
                                                                      |S
 9.17 .0246  1.11   .01   .62 72.68  2.37  .01126.79  -.03       -1. |V
                                                                      |S
 8.33 .0246  1.14   .01   .67 71.94  2.31  .01121.60  -.03       -1. |V
                                                                      |S
 7.50 .0246  1.16   .01   .73 71.12  2.24  .01116.05  -.02       -1. |V
                                                                      |S
 6.67 .0246  1.19   .01   .80 70.20  2.17  .01110.07  -.02       -2. |V
                                                                      |S
 5.83 .0075  1.23   .01   .89 69.17  2.10  .01103.58  -.01       -1. |V
                                                                      |S
 5.00 .0075  1.27   .02  1.00 67.97  2.01  .01 96.50  -.00       -0. |V
                                                                      |S
 4.17 .0075  1.33   .02  1.15 66.57  1.92  .01 88.68  -.09      -16. |VVVV
                                                                      |S
 3.33 .0160  1.39   .03  1.36 64.86  1.82  .01 79.93  -.09      -21. |VVVV
                                                                      |SS
 2.50 .0667  1.41   .05  1.60 62.67  1.71  .01 69.89  1.04      353. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.23   .08  1.69 59.71  1.61  .01 58.11  1.35      540. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .25  1.27 56.02  1.59  .01 46.09   .86      257. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     84851. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     11575. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 RHO=1027.00 KAPPA= .38 TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950 D90= .001600 DELTA=1.650000 BREAKERINDEX= .800000

SEASON NR 20
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.22 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.14% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.87 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.10	.01	.58	73.36	2.42	.01	131.64	-.01	-0.	IV
											IS
9.17	.0246	1.12	.01	.62	72.68	2.36	.01	126.79	-.00	-0.	IV
											IS
8.33	.0246	1.14	.01	.67	71.94	2.30	.01	121.60	-.01	-0.	IV
											IS
7.50	.0246	1.17	.01	.73	71.12	2.24	.01	116.05	-.00	-0.	IV
											IS
6.67	.0246	1.20	.01	.80	70.20	2.17	.01	110.07	-.01	-0.	IV
											IS
5.83	.0075	1.24	.02	.89	69.17	2.10	.01	103.58	-.00	-0.	IV
											IS
5.00	.0075	1.28	.02	1.01	67.97	2.01	.01	96.50	-.00	-0.	IV
											IS
4.17	.0075	1.34	.03	1.16	66.57	1.92	.01	88.69	-.09	-5.	IVVVVVVVVVVVVV
											ISSSSSSSSS
3.33	.0160	1.40	.03	1.37	64.86	1.82	.01	79.94	-.20	-14.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0667	1.41	.05	1.60	62.68	1.71	.01	69.90	.03	3.	IVVVV
											ISSSSS
1.67	.0667	1.23	.07	1.70	59.70	1.61	.01	58.08	.13	13.	IVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.25	1.28	55.97	1.59	.01	45.94	-.40	-31.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 6282. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1372. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 21
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION -5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.23 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .19% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 1.88 M
BREAKERANGLE -2. DEGREES

D	ALFA	I	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.10	.01	.58	73.36	2.42	.01	131.64	.02	0.	IV IS
9.17	.0246	1.12	.01	.62	72.68	2.36	.01	126.79	.02	0.	IV IS
8.33	.0246	1.14	.01	.67	71.94	2.30	.01	121.60	.01	0.	IV IS
7.50	.0246	1.17	.01	.73	71.12	2.24	.01	116.05	.01	0.	IV IS
6.67	.0246	1.20	.01	.80	70.20	2.17	.01	110.07	.01	0.	IV IS
5.83	.0075	1.24	.02	.89	69.17	2.10	.01	103.58	.00	0.	IV IS
5.00	.0075	1.28	.02	1.01	67.97	2.01	.01	96.50	.00	0.	IV IS
4.17	.0075	1.33	.03	1.16	66.57	1.92	.01	88.69	-.10	-1.	IVVVV ISS
3.33	.0160	1.39	.03	1.36	64.86	1.82	.01	79.94	-.32	-2.	IVVVVVVVVVVVVVV ISSSSSSSSS
2.50	.0667	1.41	.05	1.60	62.68	1.71	.01	69.90	-1.04	-10.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.23	.07	1.70	59.70	1.61	.01	58.09	-1.23	-13.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.25	1.27	55.99	1.59	.01	45.99	-1.33	-13.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS -1411. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -601. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RH =1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 22
WAVEHEIGHT 3.00 M (RMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.20 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .76% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 4.[illegible]9 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.23	.06	1.70	73.40	1.98	.01	131.92	-.20	-6.	IVVV IS
9.17	.0246	3.28	.06	1.82	72.73	1.94	.01	127.13	-.15	-5.	IVV IS
8.33	.0246	3.34	.07	1.96	72.00	1.90	.01	122.02	.08	3.	IV IS
7.50	.0246	3.38	.08	1.10	71.20	1.86	.01	116.55	.49	19.	IVVVVVVV ISSS
6.67	.0246	3.39	.09	2.26	70.30	1.81	.01	110.67	1.01	44.	IVVVVVVVVVVVVVVVV ISSSSSSS
5.83	.0075	3.35	.10	2.40	69.28	1.77	.01	104.27	-.34	-15.	IVVVVV ISS
5.00	.0075	3.22	.13	2.51	68.14	1.73	.01	97.46	-.30	-14.	IVVVV ISS
4.17	.0075	2.98	.19	2.53	66.88	1.69	.01	90.35	-.59	-28.	IVVVVVVVVV ISSSS
3.33	.0160	2.60	.32	2.43	65.49	1.67	.01	83.10	.08	3.	IV IS
2.50	.0667	2.09	.52	2.16	64.01	1.66	.01	75.90	3.71	374.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.46	.79	1.68	62.41	1.69	.01	68.75	2.89	191.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	1.09	.97	60.50	1.80	.01	61.07	1.91	80.	IVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 237465. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 4411. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
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PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
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SEASON NR 23
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 9.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.10 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 8.23% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 4.18 M
BREAKERANGLE 4. DEGREES

```
   D    ALFA   H   SETUP  U1    C    KSI   R    L       V       S
10.00 .0246 3.28  .06  1.72 73.40 1.98  .01131.93  -.13     -44. IVVVV
                                                                 ISS
 9.17 .0246 3.33  .07  1.85 72.73 1.94  .01127.14  -.32    -116. IVVVVVVVVVVV
                                                                 ISSSSSSS
 8.33 .0246 3.38  .08  1.98 72.00 1.90  .01122.03  -.42    -165. IVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSS
 7.50 .0246 3.42  .09  2.13 71.20 1.85  .01116.57  -.40    -169. IVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSS
 6.67 .0246 3.43  .09  2.28 70.30 1.81  .01110.68  -.24    -109. IVVVVVVVV
                                                                 ISSSSSSS
 5.83 .0075 3.38  .10  2.43 69.28 1.77  .01104.28  -.78    -388. IVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSS
 5.00 .0075 3.25  .11  2.53 68.11 1.72  .01 97.31  -.71    -373. IVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0075 3.00  .17  2.56 66.82 1.69  .01 90.08  -.92    -500. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0160 2.61  .28  2.46 65.40 1.66  .01 82.63  -.86    -456. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0667 2.09  .46  2.19 63.85 1.65  .01 75.16  1.62     906. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667 1.46  .72  1.71 62.16 1.68  .01 67.69   .47     182. IVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSS
  .83 .0667  .74 1.01  1.00 60.13 1.78  .01 59.66 -1.19    -388. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                 ISSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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TOTAL TRANSPORT IS 1135984. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -162922. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

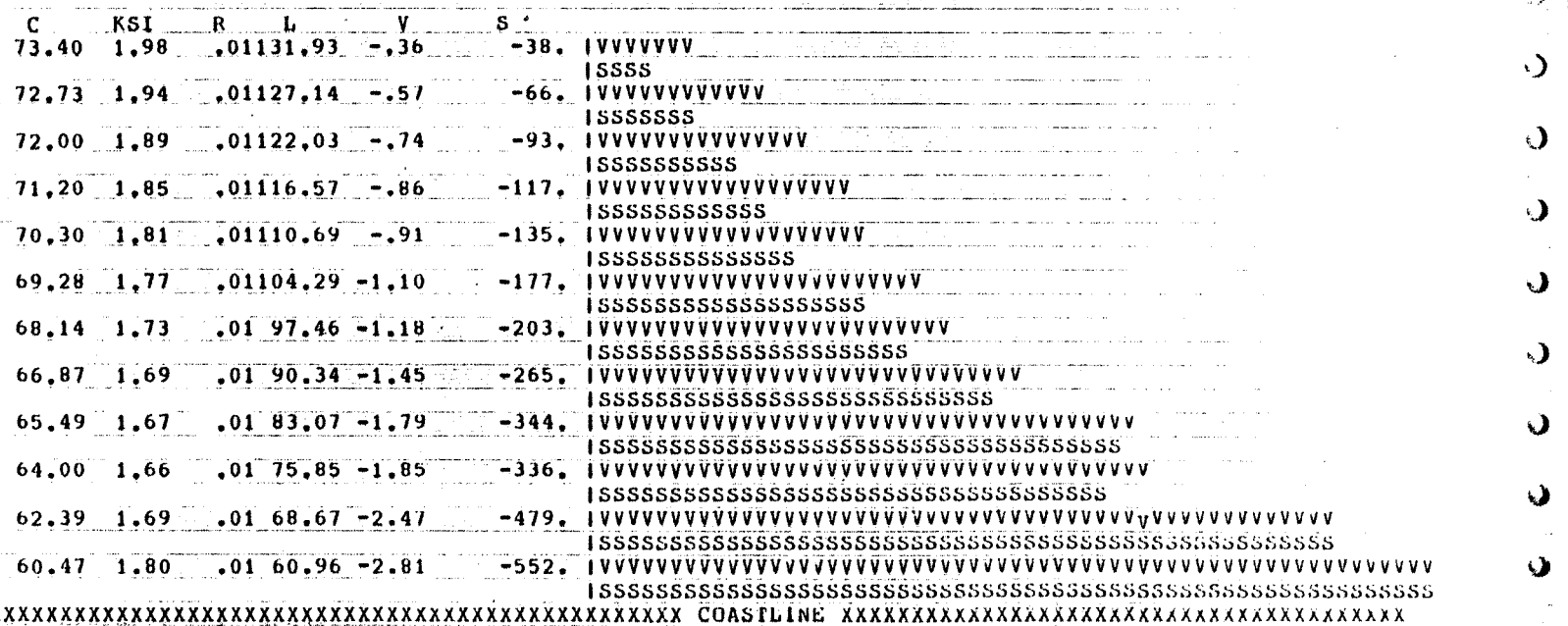
SEASON NR 24
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.20 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.56% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 4.47 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.29	.06	1.73	73.40	1.98	.01	131.93	-.36	-38.	
9.17	.0246	3.34	.07	1.85	72.73	1.94	.01	127.14	-.57	-66.	
8.33	.0246	3.40	.08	1.99	72.00	1.89	.01	122.03	-.74	-93.	
7.50	.0246	3.43	.09	2.14	71.20	1.85	.01	116.57	-.86	-117.	
6.67	.0246	3.44	.10	2.29	70.30	1.81	.01	110.69	-.91	-135.	
5.83	.0075	3.39	.10	2.43	69.28	1.77	.01	104.29	-1.10	-177.	
5.00	.0075	3.26	.13	2.53	68.14	1.73	.01	97.46	-1.18	-203.	
4.17	.0075	3.00	.19	2.55	66.87	1.69	.01	90.34	-1.45	-265.	
3.33	.0160	2.61	.32	2.45	65.49	1.67	.01	83.07	-1.79	-344.	
2.50	.0667	2.09	.52	2.17	64.00	1.66	.01	75.85	-1.85	-336.	
1.67	.0667	1.46	.79	1.68	62.39	1.69	.01	68.67	-2.47	-479.	
.83	.0667	.74	1.09	.98	60.47	1.80	.01	60.96	-2.81	-552.	



TOTAL TRANSPORT IS 99670. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -115105. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
========================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
*************************************************************


SEASON NR 25
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  -5.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.21 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .23% OF THE YEAR
*************************************************************


A SETUP DIFFERENCE DISTANCE OF    750M IS USED


REFRACTED WAVEHEIGHT 4.50 M
BREAKERANGLE -3. DEGREES

   D    ALFA   H    SETUP   U1   C     KSI    R    L        V        S
10.00 .0246  3.29    .06  1.73 73.40  1.98  .01131.93  -.46      -4. IVVVVVVV
                                                                        ISS
 9.17 .0246  3.34    .07  1.85 72.73  1.94  .01127.14  -.78      -8. IVVVVVVVVVVVV
                                                                        ISSSS
 8.33 .0246  3.39    .08  1.99 72.00  1.89  .01122.03 -1.10     -13. IVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSS
 7.50 .0246  3.43    .09  2.14 71.20  1.85  .01116.57 -1.40     -19. IVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSS
 6.67 .0246  3.44    .10  2.29 70.30  1.81  .01110.69 -1.66     -25. IVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSSSS
 5.83 .0075  3.39    .10  2.43 69.28  1.77  .01104.29 -1.41     -21. IVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSS
 5.00 .0075  3.25    .13  2.53 68.14  1.73  .01 97.48 -1.54     -25. IVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSSSS
 4.17 .0075  3.00    .20  2.55 66.88  1.69  .01 90.37 -1.80     -32. IVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSSSSSSSS
 3.33 .0160  2.61    .32  2.44 65.50  1.67  .01 83.12 -2.41     -48. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0667  2.09    .52  2.17 64.02  1.66  .01 75.92 -3.65    -109. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46    .80  1.68 62.41  1.69  .01 68.78 -3.79    -111. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   1.10   .97 60.51  1.80  .01 61.10 -3.73     -98. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                        ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   -22665. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   -16671. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
============================================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                          D90= .001600
                KAPPA=     .38                       DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
***********************************************************


SEASON NR 26
 WAVEHEIGHT   3.00 M (HRMS IN DEEP WATER)
 PERIOD      12.00 SEC
 DIRECTION -19.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    1.20 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .11% OF THE YEAR
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A SETUP DIFFERENCE DISTANCE OF    750M IS USED


REFRACTED WAVEHEIGHT 4.48 M
BREAKERANGLE -9. DEGREES

  D     ALFA   H    SETUP   U1    C     KSI    R     L      V       S
10.00 .0246  3.22   .06  1.70 73.40  1.98   .01131.92  -.55       -2. |VVVVV
                                                                      |S
 9.17 .0246  3.28   .06  1.82 72.73  1.94   .01127.12 -1.03       -5. |VVVVVVVVVV
                                                                      |S
 8.33 .0246  3.33   .07  1.95 72.00  1.90   .01122.02 -1.54       -9. |VVVVVVVVVVVVVVVV
                                                                      |SS
 7.50 .0246  3.37   .08  2.10 71.20  1.86   .01116.55 -2.07      -15. |VVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSS
 6.67 .0246  3.39   .09  2.25 70.30  1.81   .01110.67 -2.57      -22. |VVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSS
 5.83 .0075  3.35   .10  2.40 69.28  1.77   .01104.27 -1.83      -14. |VVVVVVVVVVVVVVVVVVV
                                                                      |SSS
 5.00 .0075  3.22   .13  2.51 68.14  1.73   .01 97.45 -2.03      -17. |VVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSS
 4.17 .0075  2.98   .19  2.53 66.87  1.69   .01 90.34 -2.30      -21. |VVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSS
 3.33 .0160  2.60   .32  2.43 65.49  1.67   .01 83.09 -3.25      -41. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSS
 2.50 .0667  2.09   .52  2.16 64.01  1.66   .01 75.88 -5.67     -217. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .79  1.68 62.40  1.69   .01 68.71 -5.44     -177. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.09   .97 60.49  1.80   .01 61.02 -5.01     -123. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   -36000. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   -15751. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81   COASTAL CONSTANTS D50= .000950
RHO=1027.00   D90= .001600
KAPPA= .38   DELTA=1.650000
TEMPERATURE= 15.00   BREAKERINDEX= .800000
****

SEASON NR 27
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 18.00 DEGREES (AT 10.M DEPTH)
REFR COEF .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .12% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 4.62 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	4.72	.11	2.47	73.44	1.87	.01	132.24	-.44	-3.	IVVVVVVVV ISSS
9.17	.0246	4.71	.12	2.60	72.78	1.83	.01	127.46	-.46	-3.	IVVVVVVVV ISSS
8.33	.0246	4.67	.13	2.73	72.05	1.80	.01	122.35	-.27	-2.	IVVVV ISS
7.50	.0246	4.57	.13	2.84	71.24	1.77	.01	116.84	.18	1.	IVVV IS
6.67	.0246	4.39	.12	2.92	70.33	1.74	.01	110.87	.85	7.	IVVVVVVVVVVVVVVVV ISSSSSSSS
5.83	.0075	4.13	.11	2.96	69.29	1.71	.01	104.33	-.30	-3.	IVVVVV ISSS
5.00	.0075	3.78	.18	2.93	68.21	1.69	.01	97.90	-.68	-6.	IVVVVVVVVVVVV ISSSSSS
4.17	.0075	3.33	.29	2.80	67.05	1.67	.01	91.32	-1.26	-11.	IVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSS
3.33	.0160	2.79	.46	2.56	65.78	1.66	.01	84.58	-.91	-7.	IVVVVVVVVVVVVVVVVV ISSSSSSSS
2.50	.0667	2.16	.67	2.19	64.38	1.67	.01	77.65	3.52	52.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.47	.91	1.66	62.77	1.70	.01	70.32	2.77	27.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	1.16	.96	60.77	1.82	.01	62.10	1.85	12.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 43085. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1171. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
===========================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                          D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
*************************************************************

SEASON NR 28
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION   9.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .89 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   1.37% OF THE YEAR
*************************************************************


A SETUP DIFFERENCE DISTANCE OF    750M IS USED


REFRACTED WAVEHEIGHT 4.85 M
BREAKERANGLE  5. DEGREES

  D    ALFA   H    SETUP   U1    C     KSI    R    L         V       S
10.00 .0246  4.78   .12  2.50 73.45  1.86  .01132.25  -.68     -55. |VVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSS
 9.17 .0246  4.77   .12  2.63 72.78  1.83  .01127.48  -.76     -65. |VVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSS
 8.33 .0246  4.71   .13  2.75 72.05  1.80  .01122.36  -.68     -62. |VVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSS
 7.50 .0246  4.60   .13  2.86 71.24  1.77  .01116.86  -.43     -41. |VVVVVVVVVVVV
                                                                   |SSSSSSSSSS
 6.67 .0246  4.42   .12  2.94 70.33  1.74  .01110.88  -.01      -1. |V
                                                                   |S
 5.83 .0075  4.16   .13  2.97 69.32  1.71  .01104.50  -.91     -94. |VVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSS
 5.00 .0075  3.80   .21  2.93 68.26  1.69  .01 98.19 -1.36    -148. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0075  3.34   .33  2.79 67.12  1.67  .01 91.71 -1.92    -223. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0160  2.79   .51  2.54 65.88  1.67  .01 85.09 -2.06    -231. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0667  2.17   .73  2.17 64.52  1.67  .01 78.31   .69      55. |VVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSS
 1.67 .0667  1.47   .98  1.64 62.96  1.71  .01 71.14  -.89     -58. |VVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSS
  .83 .0667   .74  1.23   .94 61.03  1.83  .01 63.10 -1.88    -136. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   304699. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   -67408. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

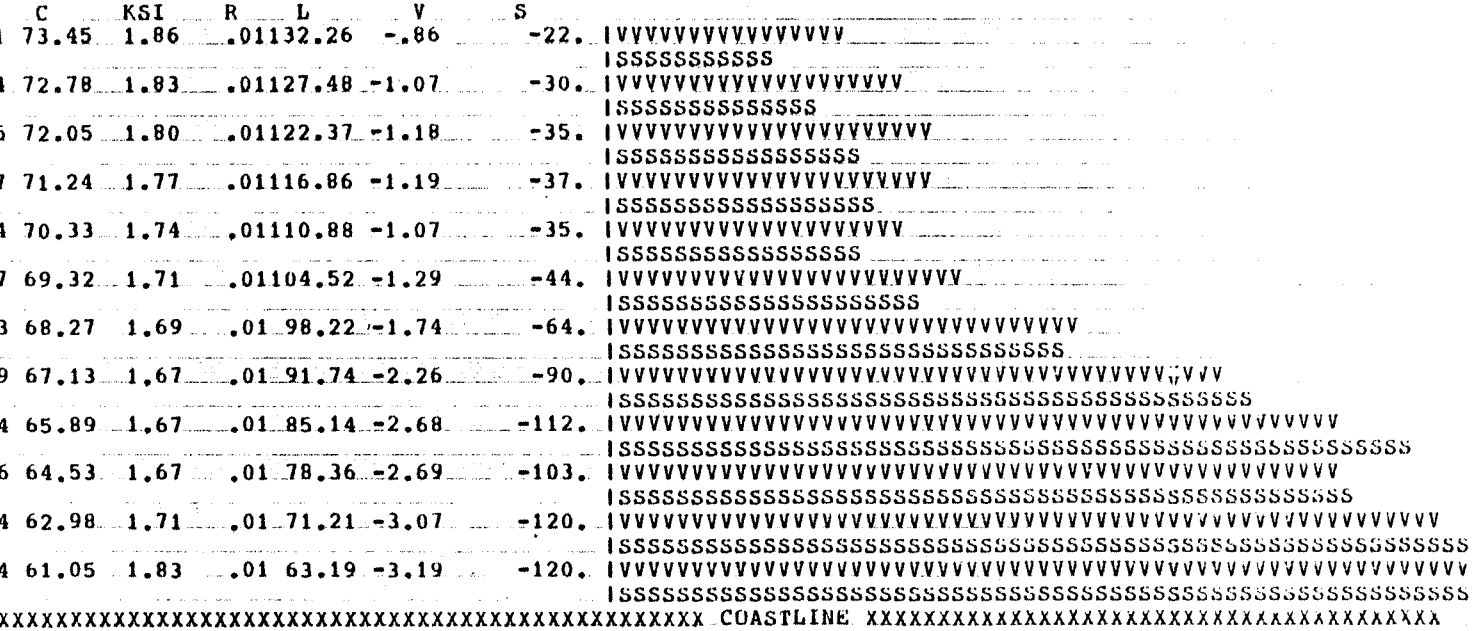
SEASON NR 29
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF .89 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .43% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 4.87 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	4.79	.12	2.51	73.45	1.86	.01	132.26	-.86	-22.	
9.17	.0246	4.78	.12	2.64	72.78	1.83	.01	127.48	-1.07	-30.	
8.33	.0246	4.73	.13	2.76	72.05	1.80	.01	122.37	-1.18	-35.	
7.50	.0246	4.62	.13	2.87	71.24	1.77	.01	116.86	-1.19	-37.	
6.67	.0246	4.43	.12	2.94	70.33	1.74	.01	110.88	-1.07	-35.	
5.83	.0075	4.16	.13	2.97	69.32	1.71	.01	104.52	-1.29	-44.	
5.00	.0075	3.80	.21	2.93	68.27	1.69	.01	98.22	-1.74	-64.	
4.17	.0075	3.34	.34	2.79	67.13	1.67	.01	91.74	-2.26	-90.	
3.33	.0160	2.79	.51	2.54	65.89	1.67	.01	85.14	-2.68	-112.	
2.50	.0667	2.17	.73	2.16	64.53	1.67	.01	78.36	-2.69	-103.	
1.67	.0667	1.47	.98	1.64	62.98	1.71	.01	71.21	-3.07	-120.	
.83	.0667	.74	1.24	.94	61.05	1.83	.01	63.19	-3.19	-120.	



TOTAL TRANSPORT IS 21591. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -35173. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

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=====================================================================================================
PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=    .38                      DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
*************************************************************

SEASON NR 30
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION  16.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.28 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .29% OF THE YEAR
*************************************************************


A SETUP DIFFERENCE DISTANCE OF    750M IS USED

REFRACTED WAVEHEIGHT 5.04 M
BREAKERANGLE  8. DEGREES

   D    ALFA   H    SETUP   U1    C     KSI    R    L        V        S
 10.00 .0246  3.46   .07  1.88 73.41  1.90  .01156.88  -.18      -2. |VVV
                                                                     |S
  9.17 .0246  3.52   .08  2.00 72.74  1.87  .01150.95   .06       1. |V
                                                                     |S
  8.33 .0246  3.57   .09  2.14 72.01  1.83  .01144.67   .46       7. |VVVVVVVV
                                                                     |SSS
  7.50 .0246  3.61   .10  2.29 71.21  1.79  .01137.99   .95      15. |VVVVVVVVVVVVVVVV
                                                                     |SSSSSSS
  6.67 .0246  3.60   .11  2.44 70.32  1.75  .01130.84  1.43      26. |VVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSS
  5.83 .0075  3.53   .12  2.57 69.31  1.71  .01123.20  -.49      -9. |VVVVVVVV
                                                                     |SSSS
  5.00 .0075  3.36   .17  2.64 68.20  1.68  .01115.18  -.57     -11. |VVVVVVVVVV
                                                                     |SSSSS
  4.17 .0075  3.08   .25  2.63 66.98  1.65  .01106.89  -.98     -19. |VVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSS
  3.33 .0160  2.66   .40  2.48 65.66  1.63  .01 98.59  -.53     -10. |VVVVVVVVV
                                                                     |SSSS
  2.50 .0667  2.11   .63  2.17 64.28  1.63  .01 90.54  3.45     116. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  1.67 .0667  1.46   .93  1.66 62.83  1.66  .01 82.69  2.47      53. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSS
   .83 .0667   .74  1.25   .94 61.11  1.78  .01 74.29  1.23      13. |VVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   108239. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     -411. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

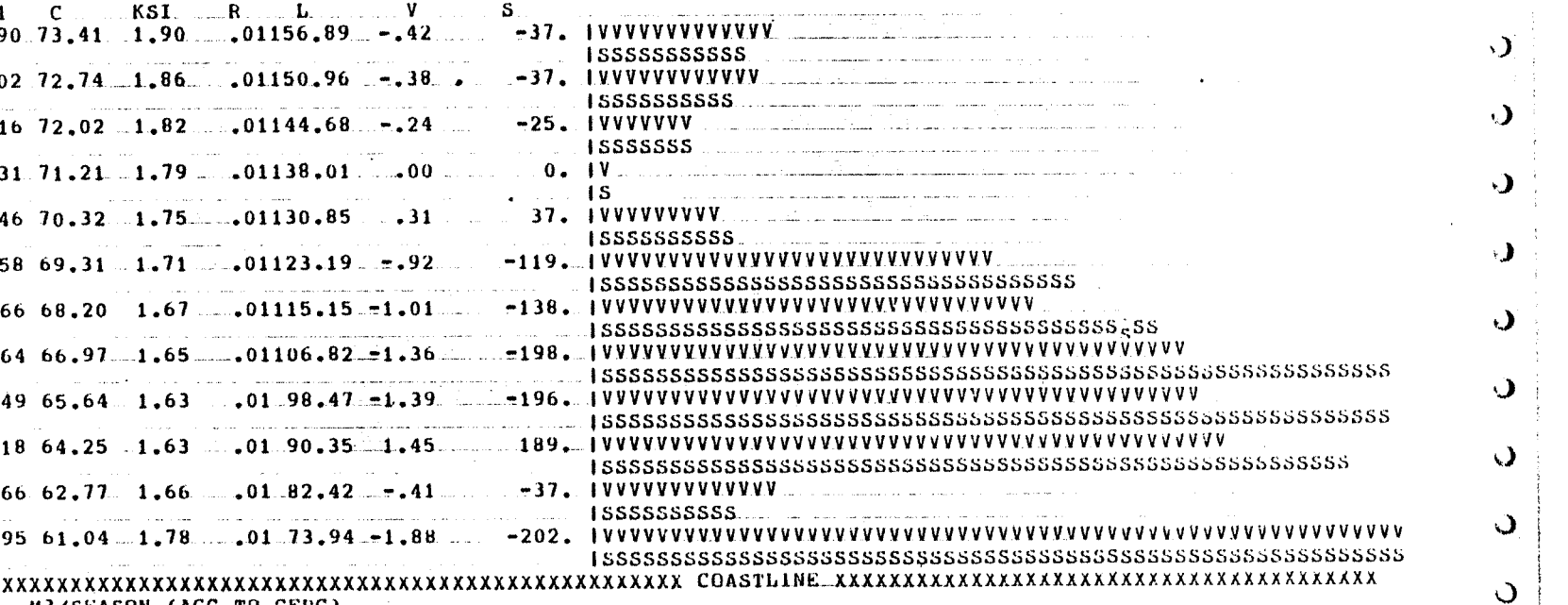
SEASON NR 31
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 9.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.28 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.05% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 4.97 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.50	.07	1.90	73.41	1.90	.01	156.89	-.42	-37.	
9.17	.0246	3.56	.08	2.02	72.74	1.86	.01	150.96	-.38	-37.	
8.33	.0246	3.61	.09	2.16	72.02	1.82	.01	144.68	-.24	-25.	
7.50	.0246	3.64	.10	2.31	71.21	1.79	.01	138.01	.00	0.	
6.67	.0246	3.63	.11	2.46	70.32	1.75	.01	130.85	.31	37.	
5.83	.0075	3.55	.12	2.58	69.31	1.71	.01	123.19	-.92	-119.	
5.00	.0075	3.38	.16	2.66	68.20	1.67	.01	115.15	-1.01	-138.	
4.17	.0075	3.09	.24	2.64	66.97	1.65	.01	106.82	-1.36	-198.	
3.33	.0160	2.66	.39	2.49	65.64	1.63	.01	98.47	-1.39	-196.	
2.50	.0667	2.12	.62	2.18	64.25	1.63	.01	90.35	1.45	189.	
1.67	.0667	1.47	.91	1.66	62.77	1.66	.01	82.42	-.41	-37.	
.83	.0667	.74	1.23	.95	61.04	1.78	.01	73.94	-1.88	-202.	



TOTAL TRANSPORT IS 468834. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -58569. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 2  * WITH SETUP INFLUENCE
===========================================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
              RHO=1027.00                          D90= .001600
              KAPPA=     .38                      DELTA=1.650000
        TEMPERATURE=  15.00                 BREAKERINDEX= .800000
*******************************************************************


SEASON NR 32
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION   2.0( DEGREES (AT 10.M DEPTH)
 REFR COEF   1.2( (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .64% OF THE YEAR
*******************************************************************



A SETUP DIFFERENCE DISTANCE OF    750M IS USED


REFRACTED WAVEHEIGHT 5.00 M
BREAKERANGLE  1. DEGREES

  D    ALFA    I   SETUP   U1   C      KSI    R    L        V          S
10.00 .0246  3.51   .07  1.90 73.41  1.90  .01156.89  -.71        -20. |VVVVVVVVVVVVV
                                                                         |SSSSSS
 9.17 .0246  3.57   .08  2.03 72.74  1.86  .01150.96  -.87        -27. |VVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSS
 8.33 .0246  3.62   .09  2.17 72.02  1.82  .01144.69 -1.00        -34. |VVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSS
 7.50 .0246  3.65   .10  2.32 71.21  1.78  .01138.01 -1.08        -40. |VVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSS
 6.67 .0246  3.64   .11  2.47 70.32  1.75  .01130.86 -1.09        -43. |VVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSS
 5.83 .0075  3.56   .13  2.59 69.31  1.71  .01123.20 -1.35        -58. |VVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSS
 5.00 .0075  3.39   .17  2.66 68.20  1.67  .01115.17 -1.47        -67. |VVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSSSSS
 4.17 .0075  3.09   .25  2.64 66.97  1.65  .01106.85 -1.79        -87. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0150  2.67   .39  2.49 65.65  1.63  .01 98.51 -2.16       -112. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV,V
                                                                         |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0667  2.12   .62  2.17 64.26  1.63  .01 90.41 -2.25       -111. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.47   .92  1.66 62.79  1.66  .01 82.50 -2.88       -156. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.24   .94 61.06  1.78  .01 74.04 -3.20       -179. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS    33040. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   -38398. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

PHYS.CAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

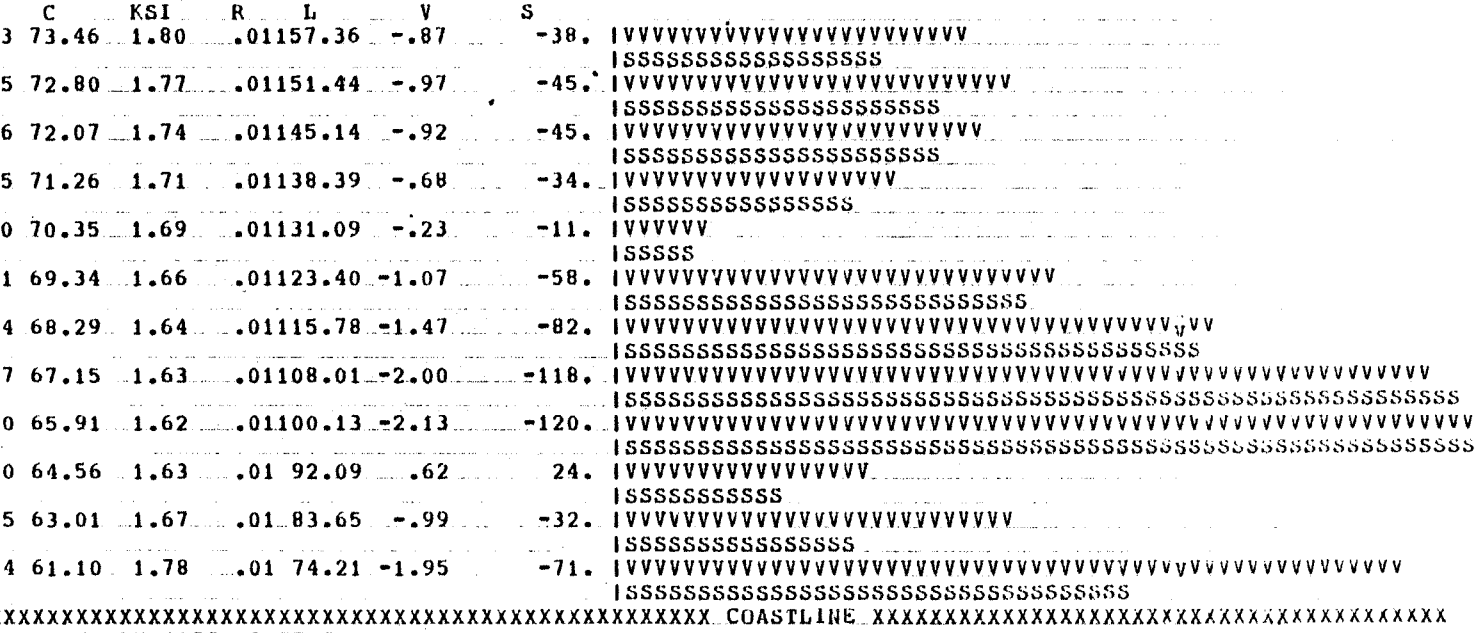
SEASON NR 33
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 9.00 DEGREES (AT 10.M DEPTH)
REFR COEF .82 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .68% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 750M IS USED

REFRACTED WAVEHEIGHT 4.92 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	5.06	.14	2.73	73.46	1.80	.01	157.36	-.87	-38.	
9.17	.0246	5.03	.14	2.85	72.80	1.77	.01	151.44	-.97	-45.	
8.33	.0246	4.95	.15	2.96	72.07	1.74	.01	145.14	-.92	-45.	
7.50	.0246	4.81	.14	3.05	71.26	1.71	.01	138.39	-.68	-34.	
6.67	.0246	4.59	.14	3.10	70.35	1.69	.01	131.09	-.23	-11.	
5.83	.0075	4.29	.15	3.11	69.34	1.66	.01	123.40	-1.07	-58.	
5.00	.0075	3.89	.22	3.04	68.29	1.64	.01	115.78	-1.47	-82.	
4.17	.0075	3.40	.35	2.87	67.15	1.63	.01	108.01	-2.00	-118.	
3.33	.0160	2.83	.52	2.60	65.91	1.62	.01	100.13	-2.13	-120.	
2.50	.0667	2.18	.74	2.20	64.56	1.63	.01	92.09	.62	24.	
1.67	.0667	1.48	.99	1.65	63.01	1.67	.01	83.65	-.99	-32.	
.83	.0667	.74	1.25	.94	61.10	1.78	.01	74.21	-1.95	-71.	



TOTAL TRANSPORT IS 135640. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -38670. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 2 * WITH SETUP INFLUENCE

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=================================================================================================================

PHYSICAL CONSTANTS   G=   9.81      COASTAL CONSTANTS D50= .000950
                   RHO=1027.00                        D90= .001600
                 KAPPA=    .38                      DELTA=1.650000
           TEMPERATURE=  15.00               BREAKERINDEX= .800000
***********************************************************


SEASON NR 34
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     14.00 SEC
 DIRECTION   2.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .82 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .21% OF THE YEAR
***********************************************************



A SETUP DIFFERENCE DISTANCE OF    750M IS USED


REFRACTED WAVEHEIGHT 4.94 M
BREAKERANGLE  1. DEGREES

  D    ALFA   H    SETUP   U1   C      KSI    R    L        V       S
10.00 .0246  5.07   .14  2.74 73.46  1.80  .01157.36 -1.02     -14. |VVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSS
 9.17 .0246  5.04   .14  2.86 72.80  1.77  .01151.45 -1.24     -18. |VVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSS
 8.33 .0246  4.96   .15  2.97 72.07  1.74  .01145.15 -1.36     -21. |VVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSS
 7.50 .0246  4.82   .15  3.05 71.26  1.71  .01138.39 -1.35     -22. |VVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSS
 6.67 .0246  4.60   .14  3.11 70.35  1.69  .01131.09 -1.22     -20. |VVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSS
 5.83 .0075  4.29   .15  3.11 69.34  1.66  .01123.43 -1.43     -25. |VVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSS
 5.00 .0075  3.89   .23  3.04 68.29  1.64  .01115.82 -1.84     -34. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 4.17 .0075  3.40   .35  2.87 67.15  1.63  .01108.06 -2.33     -46. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3.33 .0160  2.83   .53  2.60 65.92  1.62  .01100.19 -2.75     -57. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0667  2.18   .75  2.19 64.57  1.63  .01 92.17 -2.76     -52. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.48  1.00  1.65 63.03  1.67  .01 83.74 -3.13     -61. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74  1.25   .94 61.12  1.78  .01 74.33 -3.25     -61. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     9457. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   -18907. M3/SEASON (ACC TO BIJKER)
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TOTAL TRANSPORT  -612412.M3/YEAR
NEGAT TRANSPORT  -742278.M3/YEAR
POSIT TRANSPORT   129866.M3/YEAR
DOMINANT NEGAT WAVE DIRECTION    3.
DOMINANT POSIT WAVE DIRECTION    5.
```

Calculated transport in profile 3
(with influence of set-up difference)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

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CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 3  *  WITH SETUP INFLUENCE
=========================================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
               RHO=1027.00                          D90= .001600
             KAPPA=    .38                        DELTA=1.650000
       TEMPERATURE=  15.00                 BREAKERINDEX= .800000
*********************************************************


SEASON NR  1
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD      8.00 SEC
 DIRECTION  18.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.15 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .17% OF THE YEAR
*********************************************************



A SETUP DIFFERENCE DISTANCE OF    250M IS USED


REFRACTED WAVEHEIGHT 1.49 M
BREAKERANGLE  7. DEGREES

  D    ALFA   H    SETUP   U1   C     KSI    R    L       V        S
10.00 .0246   .93   .00   .42 73.36  2.84  .01 80.08  -.08     -0. |VVV
                                                                   |S
 9.17 .0246   .94   .00   .46 72.68  2.76  .01 77.76  -.08     -0. |VV
                                                                   |S
 8.33 .0246   .96   .01   .50 71.94  2.68  .01 75.19  -.07     -0. |VV
                                                                   |S
 7.50 .0246   .97   .01   .55 71.12  2.59  .01 72.33  -.07     -0. |VV
                                                                   |S
 6.67 .0246   .99   .01   .61 70.20  2.50  .01 69.15  -.07     -0. |VV
                                                                   |S
 5.83 .0075  1.02   .01   .68 69.16  2.41  .01 65.58  -.02     -0. |V
                                                                   |S
 5.00 .0075  1.05   .01   .77 67.96  2.30  .01 61.55  -.02     -0. |V
                                                                   |S
 4.17 .0075  1.09   .02   .90 66.55  2.18  .01 56.97  -.01     -0. |V
                                                                   |S
 3.33 .0160  1.14   .02  1.07 64.83  2.05  .01 51.70  -.14     -1. |VVVVV
                                                                   |SS
 2.50 .0667  1.19   .03  1.31 62.63  1.91  .01 45.48   .67      5. |VVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSS
 1.67 .0667  1.11   .04  1.52 59.57  1.76  .01 37.87  1.59     17. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .70   .17  1.27 55.43  1.70  .01 29.35  1.11     10. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     2926. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      339. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

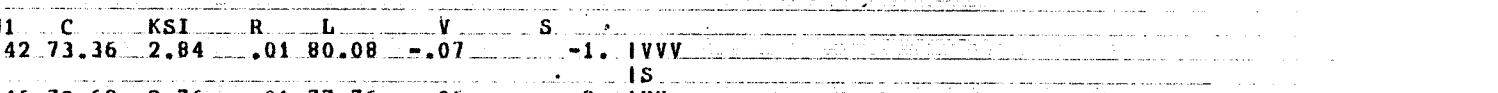
SEASON NR 2
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 15.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.13 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 18.53% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.51 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.94	.00	.42	73.36	2.84	.01	80.08	-.07	-1.	
9.17	.0246	.95	.00	.46	72.68	2.76	.01	77.76	-.06	-2.	
8.33	.0246	.96	.01	.50	71.94	2.68	.01	75.19	-.06	-3.	
7.50	.0246	.98	.01	.55	71.12	2.59	.01	72.33	-.06	-4.	
6.67	.0246	1.00	.01	.61	70.20	2.50	.01	69.15	-.05	-6.	
5.83	.0075	1.03	.01	.68	69.16	2.40	.01	65.58	-.02	-3.	
5.00	.0075	1.06	.01	.78	67.96	2.30	.01	61.55	-.01	-3.	
4.17	.0075	1.10	.02	.90	66.55	2.18	.01	56.98	-.01	-3.	
3.33	.0160	1.15	.02	1.08	64.83	2.05	.01	51.70	-.17	-88.	
2.50	.0667	1.20	.03	1.32	62.63	1.90	.01	45.49	.44	315.	
1.67	.0667	1.12	.05	1.53	59.58	1.76	.01	37.88	1.31	1389.	
.83	.0667	.70	.18	1.27	55.46	1.70	.01	29.41	.79	678.	



TOTAL TRANSPORT IS 249241. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 23698. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 3
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.13 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .77% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.53 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.94	.00	.43	73.36	2.83	.01	80.08	-.05	-0.	|VVV |S
9.17	.0246	.96	.00	.46	72.68	2.76	.01	77.76	-.05	-0.	|VVV |S
8.33	.0246	.97	.01	.50	71.94	2.67	.01	75.19	-.05	-0.	|VV |S
7.50	.0246	.99	.01	.55	71.12	2.59	.01	72.33	-.04	-0.	|VV |S
6.67	.0246	1.01	.01	.61	70.20	2.50	.01	69.15	-.04	-0.	|VV |S
5.83	.0075	1.03	.01	.69	69.16	2.40	.01	65.58	-.01	-0.	|V |S
5.00	.0075	1.06	.01	.78	67.96	2.29	.01	61.55	-.01	-0.	|V |S
4.17	.0075	1.11	.02	.91	66.55	2.18	.01	56.98	-.01	-0.	|V |S
3.33	.0160	1.16	.02	1.08	64.83	2.05	.01	51.70	-.19	-4.	|VVVVVVVVVVVV |SSSSSS
2.50	.0667	1.20	.03	1.32	62.63	1.90	.01	45.49	.21	6.	|VVVVVVVVVVVVV |SSSSSSSSS
1.67	.0667	1.12	.05	1.53	59.58	1.76	.01	37.89	.94	38.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVvVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.70	.18	1.27	55.47	1.70	.01	29.44	.26	8.	|VVVVVVVVVVVVVVVV |SSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 7760. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 385. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

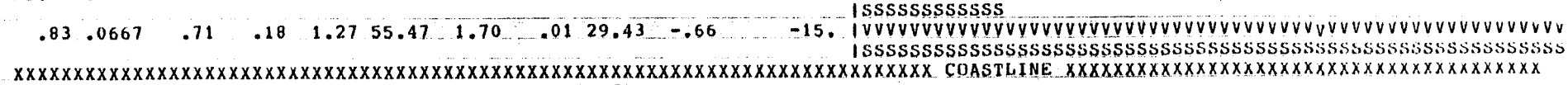
SEASON NR 4
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 5.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.12 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .51% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.52 M
BREAKERANGLE 2. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.95	.00	.43	73.36	2.83	.01	80.08	-.02	-0.	
9.17	.0246	.96	.00	.47	72.68	2.75	.01	77.76	-.02	-0.	
8.33	.0246	.98	.01	.51	71.94	2.67	.01	75.19	-.02	-0.	
7.50	.0246	.99	.01	.56	71.12	2.58	.01	72.33	-.02	-0.	
6.67	.0246	1.01	.01	.62	70.20	2.49	.01	69.15	-.02	-0.	
5.83	.0075	1.04	.01	.69	69.16	2.40	.01	65.58	-.01	-0.	
5.00	.0075	1.07	.01	.79	67.96	2.29	.01	61.56	-.00	-0.	
4.17	.0075	1.11	.02	.91	66.55	2.17	.01	56.98	-.00	-0.	
3.33	.0160	1.16	.02	1.09	64.83	2.04	.01	51.70	-.20	-3.	
2.50	.0667	1.21	.03	1.33	62.63	1.90	.01	45.49	-.20	-4.	
1.67	.0667	1.13	.05	1.53	59.58	1.76	.01	37.89	.14	3.	
.83	.0667	.71	.18	1.27	55.47	1.70	.01	29.43	-.66	-15.	



TOTAL TRANSPORT IS 2340. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -361. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 5
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION -21.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.13 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .24% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.49 M
BREAKERANGLE -8. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.92	.00	.42	73.36	2.85	.01	80.08	.09	0.	VV
											S
9.17	.0246	.94	.00	.45	72.68	2.77	.01	77.76	.08	0.	VV
											S
8.33	.0246	.95	.00	.49	71.94	2.69	.01	75.19	.08	0.	VV
											S
7.50	.0246	.97	.01	.54	71.12	2.60	.01	72.33	.08	0.	V
											S
6.67	.0246	.99	.01	.60	70.20	2.51	.01	69.15	.07	0.	V
											S
5.83	.0075	1.01	.01	.67	69.16	2.41	.01	65.58	.02	0.	V
											S
5.00	.0075	1.04	.01	.77	67.96	2.30	.01	61.55	.02	0.	V
											S
4.17	.0075	1.08	.02	.89	66.55	2.19	.01	56.97	.01	0.	V
											S
3.33	.0160	1.13	.02	1.06	64.83	2.05	.01	51.70	-.20	-1.	VVVVV
											S
2.50	.0667	1.18	.03	1.30	62.63	1.91	.01	45.48	-1.33	-16.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSS
1.67	.0667	1.11	.04	1.52	59.57	1.76	.01	37.86	-2.24	-40.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.70	.17	1.27	55.42	1.70	.01	29.35	-2.43	-49.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS -4320. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1353. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

==

PHYSICAL CONSTANTS G= 9.81 RHO=1027.00 KAPPA= .38 TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950 D90= .001600 DELTA=1.650000 BREAKERINDEX= .800000

****

SEASON NR 6
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 17.00 DEGREES (AT 10.M DEPTH)
REFR COEF .80 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR

****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 2.75 M
BREAKERANGLE 9. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	2.81	.03	1.27	73.38	2.25	.01	80.16	-.14	-3.	VVVV SS
9.17	.0246	2.84	.04	1.37	72.71	2.19	.01	77.86	-.13	-3.	VVVV SS
8.33	.0246	2.87	.04	1.49	71.97	2.14	.01	75.32	-.11	-3.	VVV SS
7.50	.0246	2.91	.05	1.63	71.16	2.08	.01	72.50	-.08	-2.	VV S
6.67	.0246	2.93	.06	1.78	70.26	2.02	.01	69.36	-.16	-5.	VVVVV SSS
5.83	.0075	2.93	.07	1.94	69.23	1.96	.01	65.83	-.76	-28.	VVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSS
5.00	.0075	2.87	.07	2.09	68.05	1.90	.01	61.84	-1.05	-43.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0075	2.71	.06	2.21	66.64	1.84	.01	57.26	-1.01	-44.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0160	2.43	.06	2.26	64.92	1.79	.01	51.98	-.35	-15.	VVVVVVVVVVVV SSSSSSSSSS
2.50	.0667	2.00	.18	2.13	63.07	1.76	.01	46.69	1.70	86.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.42	.36	1.77	60.91	1.75	.01	41.05	.30	11.	VVVVVVVVVV SSSSSSS
.83	.0667	.74	.60	1.11	58.17	1.83	.01	34.77	-1.62	-62.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 64030. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -12644. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

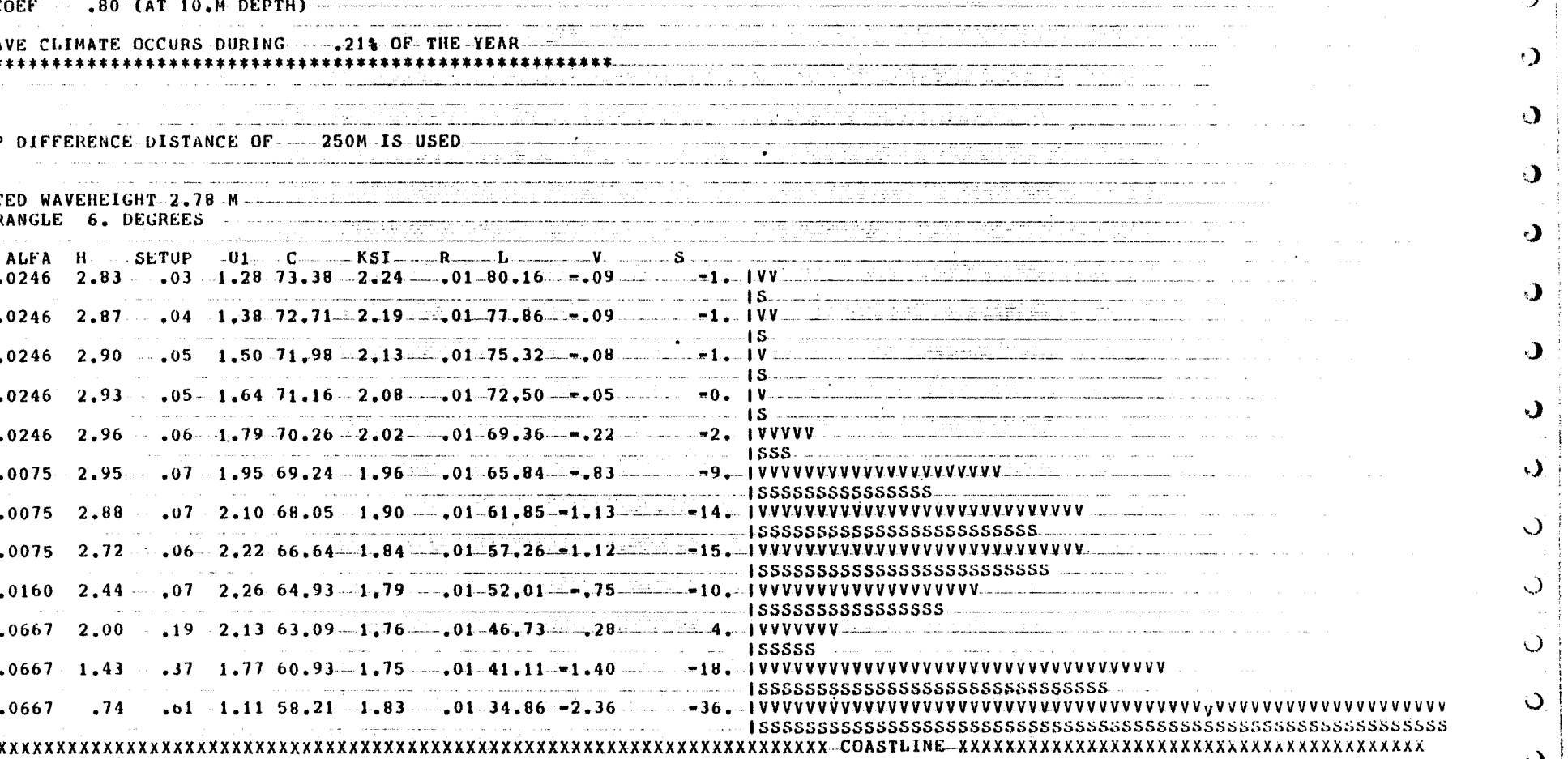
SEASON NR 7
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 8.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF .80 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 2.78 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	2.83	.03	1.28	73.38	2.24	.01	80.16	-.09	-1.	
9.17	.0246	2.87	.04	1.38	72.71	2.19	.01	77.86	-.09	-1.	
8.33	.0246	2.90	.05	1.50	71.98	2.13	.01	75.32	-.08	-1.	
7.50	.0246	2.93	.05	1.64	71.16	2.08	.01	72.50	-.05	-0.	
6.67	.0246	2.96	.06	1.79	70.26	2.02	.01	69.36	-.22	-2.	
5.83	.0075	2.95	.07	1.95	69.24	1.96	.01	65.84	-.83	-9.	
5.00	.0075	2.88	.07	2.10	68.05	1.90	.01	61.85	-1.13	-14.	
4.17	.0075	2.72	.06	2.22	66.64	1.84	.01	57.26	-1.12	-15.	
3.33	.0160	2.44	.07	2.26	64.93	1.79	.01	52.01	-.75	-10.	
2.50	.0667	2.00	.19	2.13	63.09	1.76	.01	46.73	.28	4.	
1.67	.0667	1.43	.37	1.77	60.93	1.75	.01	41.11	-1.40	-18.	
.83	.0667	.74	.61	1.11	58.21	1.83	.01	34.86	-2.36	-36.	



TOTAL TRANSPORT IS 13055. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -5261. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 8
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 21.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.25% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.76 M
BREAKERANGLE 7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	.99	.00	.50	73.36	2.60	.01	106.30	-.09	-0.	IVV IS
9.17	.0246	1.01	.01	.54	72.68	2.54	.01	102.66	-.08	-1.	IVV IS
8.33	.0246	1.03	.01	.58	71.94	2.47	.01	98.74	-.08	-1.	IVV IS
7.50	.0246	1.05	.01	.63	71.12	2.39	.01	94.48	-.07	-1.	IVV IS
6.67	.0246	1.08	.01	.70	70.20	2.32	.01	89.85	-.07	-1.	IV IS
5.83	.0075	1.11	.01	.78	69.16	2.23	.01	84.78	-.02	-0.	IV IS
5.00	.0075	1.14	.01	.88	67.97	2.14	.01	79.18	-.01	-0.	IV IS
4.17	.0075	1.19	.02	1.02	66.56	2.04	.01	72.94	-.09	-5.	IVV IS
3.33	.0160	1.25	.03	1.20	64.84	1.92	.01	65.89	-.25	-18.	IVVVVVVV ISSS
2.50	.0667	1.29	.04	1.45	62.65	1.80	.01	57.72	1.54	189.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.17	.06	1.61	59.66	1.68	.01	48.02	2.13	347.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.71	.22	1.27	55.81	1.64	.01	37.79	1.29	157.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 58904. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 7107. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 9
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 12.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.26 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 23.34% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.80 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.01	.01	.51	73.36	2.59	.01	106.30	-.05	-3.	VV
											S
9.17	.0246	1.03	.01	.55	72.68	2.52	.01	102.66	-.05	-3.	VV
											S
8.33	.0246	1.05	.01	.59	71.94	2.46	.01	98.74	-.05	-5.	VV
											S
7.50	.0246	1.07	.01	.65	71.12	2.38	.01	94.49	-.04	-6.	VV
											S
6.67	.0246	1.10	.01	.71	70.20	2.31	.01	89.85	-.04	-8.	V
											S
5.83	.0075	1.13	.01	.79	69.16	2.22	.01	84.78	-.01	-3.	V
											S
5.00	.0075	1.17	.02	.90	67.97	2.13	.01	79.19	-.01	-3.	V
											S
4.17	.0075	1.22	.02	1.04	66.56	2.03	.01	72.95	-.14	-77.	VVVVVV
											SS
3.33	.0160	1.28	.03	1.23	64.84	1.91	.01	65.90	-.37	-280.	VVVVVVVVVVVVVVVVVV
											SSSSSSSSS
2.50	.0667	1.31	.04	1.47	62.65	1.79	.01	57.74	.87	921.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.07	1.62	59.67	1.68	.01	48.06	1.31	1757.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.23	1.27	55.87	1.64	.01	37.92	.11	94.	VVVVV
											SSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 371418. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS 11997. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 3  *  WITH SETUP INFLUENCE
=================================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                        D90= .001600
                KAPPA=    .38                      DELTA=1.650000
          TEMPERATURE=  15.00              BREAKERINDEX= .800000
*************************************************************


SEASON NR 10
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     10.00 SEC
 DIRECTION  11.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.25 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   7.26% OF THE YEAR
*************************************************************



A SETUP DIFFERENCE DISTANCE OF    250M IS USED


REFRACTED WAVEHEIGHT 1.78 M
BREAKERANGLE  4. DEGREES

  D    ALFA   H    SETUP   U1   C     KSI    R    L        V      S
10.00 .0246  1.01   .01   .51 73.36  2.59  .01106.30  -.05     -1. |VV
                                                                   |S
 9.17 .0246  1.03   .01   .55 72.68  2.52  .01102.66  -.05     -1. |VV
                                                                   |S
 8.33 .0246  1.05   .01   .59 71.94  2.45  .01 98.74  -.04     -1. |VV
                                                                   |S
 7.50 .0246  1.07   .01   .65 71.12  2.38  .01 94.49  -.04     -2. |VV
                                                                   |S
 6.67 .0246  1.10   .01   .71 70.20  2.30  .01 89.85  -.04     -2. |V
                                                                   |S
 5.83 .0075  1.13   .01   .80 69.16  2.22  .01 84.78  -.01     -1. |V
                                                                   |S
 5.00 .0075  1.17   .02   .90 67.97  2.13  .01 79.19  -.01     -1. |V
                                                                   |S
 4.17 .0075  1.22   .02  1.04 66.56  2.03  .01 72.95  -.13    -22. |VVVVVV
                                                                   |SS
 3.33 .0160  1.28   .03  1.23 64.84  1.91  .01 65.90  -.38    -89. |VVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSS
 2.50 .0667  1.31   .04  1.47 62.65  1.79  .01 57.74   .73    235. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.18   .07  1.62 59.66  1.68  .01 48.05  1.17    474. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .23  1.27 55.85  1.64  .01 37.88  -.07    -18. |VVV
                                                                   |SS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   104722. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     1681. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE
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PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                          D90= .001600
                KAPPA=     .38                       DELTA=1.650000
          TEMPERATURE=  15.00                  BREAKERINDEX= .800000
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****

SEASON NR 11
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 2.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.25 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .64% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.80 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.02	.01	.51	73.36	2.58	.01	106.30	-.01	-0.	V
											S
9.17	.0246	1.04	.01	.55	72.68	2.52	.01	102.66	-.01	-0.	V
											S
8.33	.0246	1.06	.01	.60	71.94	2.45	.01	98.74	-.01	-0.	V
											S
7.50	.0246	1.08	.01	.65	71.12	2.38	.01	94.49	-.01	-0.	V
											S
6.67	.0246	1.11	.01	.72	70.20	2.30	.01	89.86	-.01	-0.	V
											S
5.83	.0075	1.14	.01	.80	69.16	2.22	.01	84.78	-.00	-0.	V
											S
5.00	.0075	1.18	.02	.91	67.97	2.13	.01	79.19	-.00	-0.	V
											S
4.17	.0075	1.23	.02	1.05	66.56	2.03	.01	72.95	-.15	-2.	VVVVVV
											SS
3.33	.0160	1.29	.03	1.24	64.84	1.91	.01	65.90	-.49	-10.	VVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSS
2.50	.0667	1.32	.04	1.48	62.66	1.79	.01	57.74	-.50	-13.	VVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSS
1.67	.0667	1.18	.07	1.63	59.67	1.67	.01	48.07	-.48	-15.	VVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSS
.83	.0667	.72	.23	1.27	55.87	1.64	.01	37.93	-1.32	-46.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 1720. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1674. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC bV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

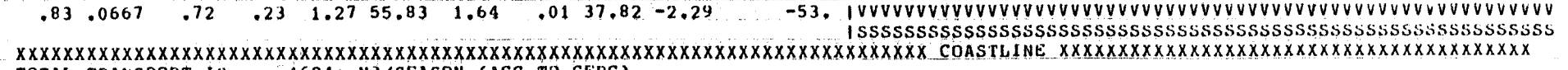
SEASON NR 12
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -12.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.24 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .30% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 1.77 M
BREAKERANGLE -4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.01	.01	.51	73.36	2.59	.01	106.30	.05	0.	
9.17	.0246	1.03	.01	.55	72.68	2.52	.01	102.66	.05	0.	
8.33	.0246	1.05	.01	.59	71.94	2.46	.01	98.74	.05	0.	
7.50	.0246	1.07	.01	.65	71.12	2.38	.01	94.49	.04	0.	
6.67	.0246	1.10	.01	.71	70.20	2.31	.01	89.85	.04	0.	
5.83	.0075	1.13	.01	.79	69.16	2.22	.01	84.78	.01	0.	
5.00	.0075	1.17	.02	.90	67.97	2.13	.01	79.19	.01	0.	
4.17	.0075	1.22	.02	1.04	66.56	2.03	.01	72.95	-.12	-1.	
3.33	.0160	1.28	.03	1.23	64.84	1.91	.01	65.90	-.59	-6.	
2.50	.0667	1.31	.04	1.47	62.65	1.79	.01	57.74	-1.72	-30.	
1.67	.0667	1.18	.06	1.62	59.66	1.68	.01	48.04	-2.14	-47.	
.83	.0667	.72	.23	1.27	55.83	1.64	.01	37.82	-2.29	-53.	



TOTAL TRANSPORT IS -4624. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -1992. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

==

PHYSICAL CONSTANTS G= 9.81
RHO=1027.00
KAPPA= .38
TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950
D90= .001600
DELTA=1.650000
BREAKERINDEX= .800000

****

SEASON NR 13
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF .79 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .69% OF THE YEAR

****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 2.96 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.04	.05	1.52	73.39	2.08	.01	106.47	-.07	-2.	V S
9.17	.0246	3.09	.05	1.64	72.72	2.04	.01	102.88	-.06	-2.	V S
8.33	.0246	3.14	.06	1.76	71.99	1.99	.01	99.00	-.05	-1,	V S
7.50	.0246	3.18	.07	1.91	71.18	1.94	.01	94.81	-.02	-1.	V S
6.67	.0246	3.20	.08	2.06	70.28	1.89	.01	90.25	-.66	-24.	VVVVVVVVVVVVVVV SSSSSSSSSS
5.83	.0075	3.18	.09	2.22	69.26	1.84	.01	85.25	-1.25	-53.	VVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSS
5.00	.0075	3.08	.09	2.35	68.08	1.80	.01	79.69	-1.48	-69.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0075	2.88	.08	2.43	66.66	1.75	.01	73.41	-1.37	-66.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0160	2.54	.10	2.42	65.01	1.71	.01	66.56	-1.23	-59.	VVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0667	2.06	.22	2.22	63.20	1.68	.01	59.67	.00	0.	V S
1.67	.0667	1.45	.42	1.80	61.10	1.68	.01	52.51	-1.72	-79.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.66	1.10	58.49	1.76	.01	44.67	-2.63	-142.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 46870. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -25989. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 14
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 12.00 DEGREES (AT 10.M DEPTH)
REFR COEF .77 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 7.35% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 2.95 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.04	.05	1.52	73.39	2.09	.01	106.47	-.07	-19.	V S
9.17	.0246	3.08	.05	1.63	72.72	2.04	.01	102.87	-.07	-19.	V S
8.33	.0246	3.13	.06	1.76	71.99	1.99	.01	99.00	-.05	-17.	V S
7.50	.0246	3.17	.07	1.91	71.18	1.94	.01	94.81	-.03	-10.	V S
6.67	.0246	3.20	.08	2.06	70.28	1.89	.01	90.25	-.65	-252.	VVVVVVVVVVVVVVV SSSSSSSSSS
5.83	.0075	3.18	.08	2.22	69.26	1.84	.01	85.25	-1.24	-554.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSS
5.00	.0075	3.08	.09	2.35	68.08	1.80	.01	79.69	-1.47	-731.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0075	2.88	.08	2.43	66.66	1.75	.01	73.41	-1.36	-697.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0160	2.54	.10	2.42	65.01	1.71	.01	66.54	-1.19	-601.	VVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0667	2.06	.22	2.22	63.19	1.68	.01	59.66	.26	112.	VVVVVV SSSS
1.67	.0667	1.45	.41	1.80	61.09	1.68	.01	52.48	-1.55	-720.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.65	1.10	58.48	1.76	.01	44.64	-2.53	-1406.	VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 490356. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -270013. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE
==

PHYSICAL CONSTANTS G= 9.81 RHO=1027.00 KAPPA= .38 TEMPERATURE= 15.00

COASTAL CONSTANTS D50= .000950 D90= .001600 DELTA=1.650000 BREAKERINDEX= .800000

****

SEASON NR 15
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 11.00 DEGREES (AT 10.M DEPTH)
REFR COEF .83 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.35% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.11 M
BREAKERANGLE 5. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.04	.05	1.52	73.39	2.08	.01	106.47	-.07	-6.	|V |S
9.17	.0246	3.09	.05	1.64	72.72	2.04	.01	102.88	-.07	-6.	|V |S
8.33	.0246	3.14	.06	1.76	71.99	1.99	.01	99.00	-.05	-5.	|V |S
7.50	.0246	3.18	.07	1.91	71.18	1.94	.01	94.81	-.24	-27.	|VVVVV |SS
6.67	.0246	3.20	.08	2.06	70.28	1.89	.01	90.25	-.93	-119.	|VVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSS
5.83	.0075	3.18	.09	2.22	69.26	1.84	.01	85.25	-1.43	-211.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSS
5.00	.0075	3.08	.09	2.35	68.08	1.80	.01	79.69	-1.59	-257.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
4.17	.0075	2.88	.08	2.43	66.66	1.75	.01	73.41	-1.42	-235.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSS
3.33	.0160	2.54	.12	2.41	65.06	1.71	.01	66.75	-1.52	-259.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0667	2.06	.25	2.21	63.28	1.69	.01	59.98	-.35	-48.	|VVVVVVV |SSSSS
1.67	.0667	1.45	.45	1.79	61.24	1.69	.01	52.96	-1.99	-331.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.70	1.09	58.71	1.77	.01	45.29	-2.83	-560.	|VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS 176203. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -102977. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

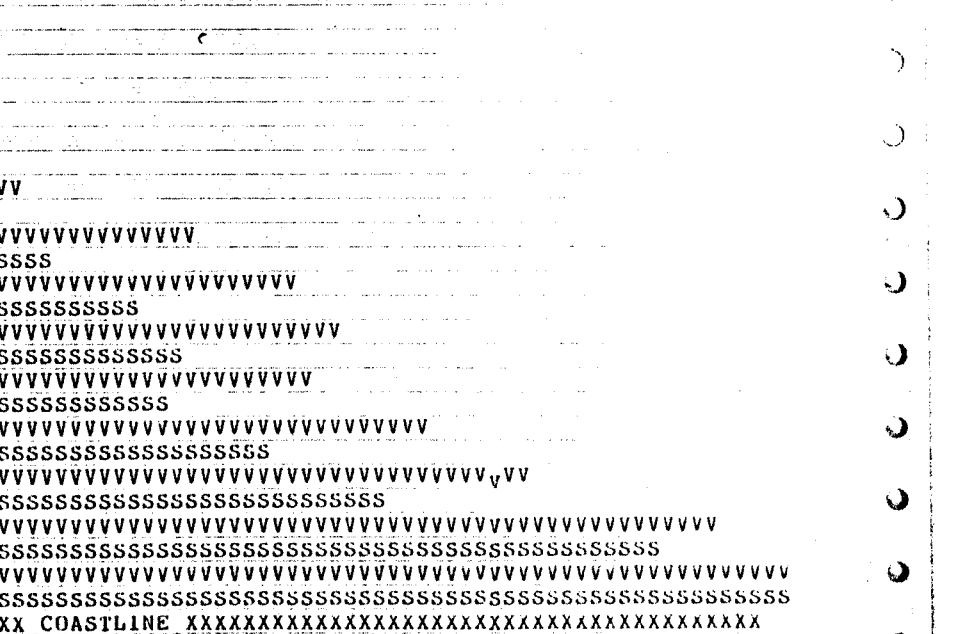
SEASON NR 16
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION 3.00 DEGREES (AT 10.M DEPTH)
REFR COEF .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .21% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.17 M
BREAKERANGLE 1. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.06	.05	1.53	73.39	2.08	.01	106.47	-.02	-0.	
9.17	.0246	3.11	.05	1.65	72.72	2.04	.01	102.88	-.02	-0.	
8.33	.0246	3.16	.06	1.78	71.99	1.99	.01	99.01	-.01	-0.	
7.50	.0246	3.20	.07	1.92	71.18	1.94	.01	94.82	-.39	-4.	
6.67	.0246	3.22	.08	2.08	70.28	1.89	.01	90.26	-1.09	-13.	
5.83	.0075	3.19	.09	2.23	69.26	1.84	.01	85.25	-1.55	-21.	
5.00	.0075	3.09	.09	2.36	68.08	1.79	.01	79.69	-1.73	-26.	
4.17	.0075	2.89	.08	2.44	66.66	1.75	.01	73.41	-1.61	-25.	
3.33	.0160	2.54	.13	2.41	65.08	1.71	.01	66.82	-2.04	-35.	
2.50	.0667	2.06	.26	2.21	63.31	1.69	.01	60.10	-2.49	-46.	
1.67	.0667	1.45	.47	1.78	61.29	1.69	.01	53.13	-3.26	-75.	
.83	.0667	.74	.72	1.08	58.80	1.78	.01	45.53	-3.59	-88.	



TOTAL TRANSPORT IS 4500. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -12347. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

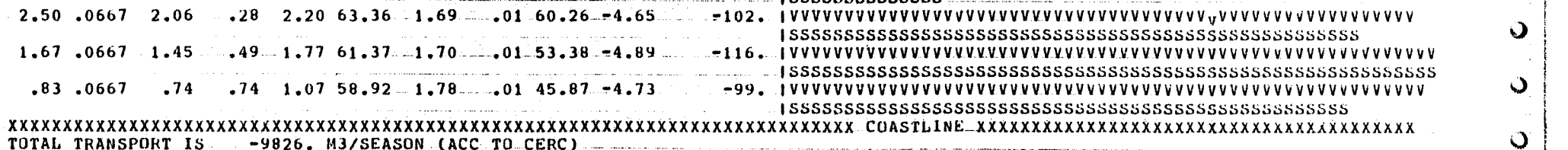
SEASON NR 17
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 10.00 SEC
DIRECTION -12.00 DEGREES (AT 10.M DEPTH)
REFR COEF .89 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .10% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.25 M
BREAKERANGLE -6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.04	.05	1.52	73.39	2.09	.01	106.47	.09	0.	
9.17	.0246	3.09	.05	1.63	72.72	2.04	.01	102.88	.07	0.	
8.33	.0246	3.13	.06	1.76	71.99	1.99	.01	99.00	.04	0.	
7.50	.0246	3.17	.07	1.91	71.18	1.94	.01	94.81	-.62	-3.	
6.67	.0246	3.20	.08	2.06	70.28	1.89	.01	90.25	-1.37	-8.	
5.83	.0075	3.18	.08	2.22	69.26	1.84	.01	85.25	-1.73	-12.	
5.00	.0075	3.08	.09	2.35	68.08	1.80	.01	79.69	-1.97	-15.	
4.17	.0075	2.88	.08	2.43	66.66	1.75	.01	73.41	-1.95	-15.	
3.33	.0160	2.54	.14	2.40	65.10	1.71	.01	66.93	-2.84	-29.	
2.50	.0667	2.06	.28	2.20	63.36	1.69	.01	60.26	-4.65	-102.	
1.67	.0667	1.45	.49	1.77	61.37	1.70	.01	53.38	-4.89	-116.	
.83	.0667	.74	.74	1.07	58.92	1.78	.01	45.87	-4.73	-99.	



TOTAL TRANSPORT IS -9826. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -10042. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

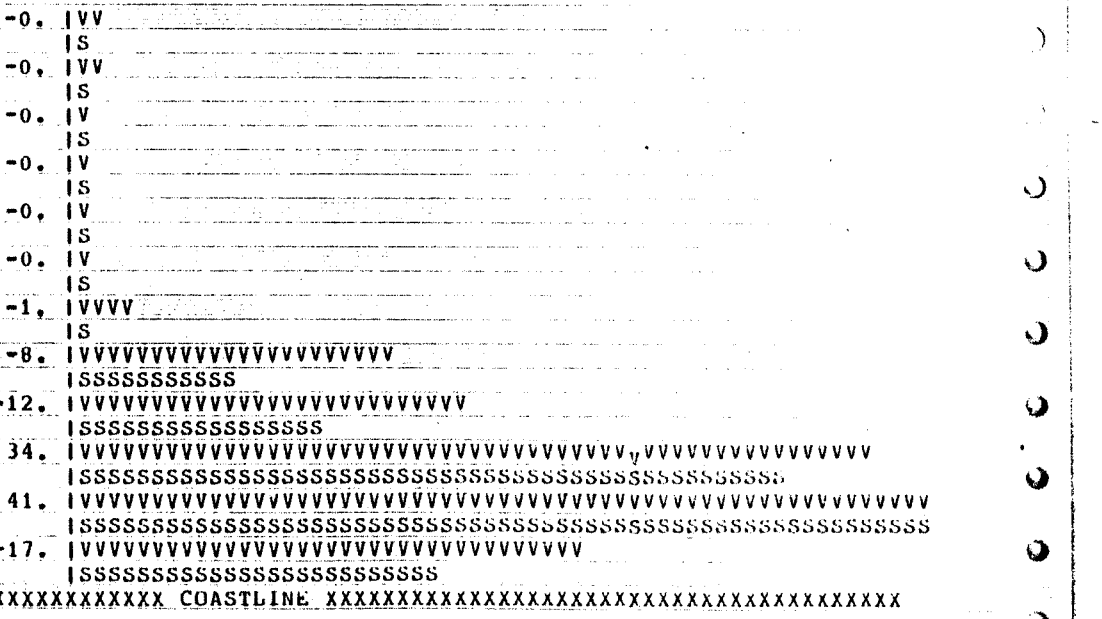
SEASON NR 18
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.37 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .63% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 2.08 M
BREAKERANGLE 3. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.09	.01	.58	73.36	2.42	.01	131.64	-.04	-0.	
9.17	.0246	1.11	.01	.62	72.68	2.37	.01	126.78	-.04	-0.	
8.33	.0246	1.14	.01	.67	71.94	2.31	.01	121.60	-.04	-0.	
7.50	.0246	1.16	.01	.73	71.12	2.24	.01	116.05	-.03	-0.	
6.67	.0246	1.19	.01	.80	70.20	2.17	.01	110.07	-.03	-0.	
5.83	.0075	1.23	.01	.89	69.17	2.10	.01	103.58	-.01	-0.	
5.00	.0075	1.27	.02	1.00	67.97	2.02	.01	96.50	-.10	-1.	
4.17	.0075	1.33	.02	1.15	66.57	1.92	.01	88.68	-.44	-8.	
3.33	.0160	1.39	.03	1.36	64.86	1.82	.01	79.93	-.53	-12.	
2.50	.0667	1.41	.05	1.59	62.68	1.71	.01	69.90	1.08	34.	
1.67	.0667	1.23	.08	1.69	59.75	1.62	.01	58.27	1.17	41.	
.83	.0667	.72	.29	1.25	56.26	1.60	.01	46.80	-.70	-17.	



TOTAL TRANSPORT IS 11430. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -721. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 3  *  WITH SETUP INFLUENCE
==============================================================================================================

PHYSICAL CONSTANTS  G=    9.81     COASTAL CONSTANTS D50= .000950
                RHO=1027.00                          D90= .001600
              KAPPA=     .38                       DELTA=1.650000
        TEMPERATURE=   15.00                BREAKERINDEX= .800000
******************************************************************


SEASON NR 19
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  14.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.37 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING   6.87% OF THE YEAR
******************************************************************


A SETUP DIFFERENCE DISTANCE OF    250M IS USED


REFRACTED WAVEHEIGHT 2.07 M
BREAKERANGLE  5. DEGREES

  D    ALFA   H    SETUP   U1   C     KSI    R     L        V       S
10.00 .0246  1.08   .01   .57 73.36  2.43  .01131.64  -.06       -1. |VV
                                                                     |S
 9.17 .0246  1.10   .01   .61 72.68  2.37  .01126.78  -.05       -2. |V
                                                                     |S
 8.33 .0246  1.13   .01   .66 71.94  2.31  .01121.60  -.05       -2. |V
                                                                     |S
 7.50 .0246  1.15   .01   .72 71.12  2.24  .01116.05  -.05       -3. |V
                                                                     |S
 6.67 .0246  1.18   .01   .79 70.20  2.18  .01110.07  -.04       -3. |V
                                                                     |S
 5.83 .0075  1.22   .01   .88 69.17  2.10  .01103.58  -.01       -1. |V
                                                                     |S
 5.00 .0075  1.26   .02  1.00 67.97  2.02  .01 96.50  -.08      -10. |VV
                                                                     |S
 4.17 .0075  1.32   .02  1.15 66.57  1.93  .01 88.68  -.41      -77. |VVVVVVVVVVVVVV
                                                                     |SSSSSS
 3.33 .0160  1.38   .03  1.35 64.86  1.82  .01 79.93  -.42     -100. |VVVVVVVVVVVVVV
                                                                     |SSSSSSS
 2.50 .0667  1.40   .05  1.59 62.67  1.71  .01 69.89  1.59      617. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.22   .08  1.68 59.75  1.62  .01 58.25  1.71      756. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                     |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .28  1.25 56.25  1.60  .01 46.75   .13       30. |VVVV
                                                                     |SS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS   171085. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     4198. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

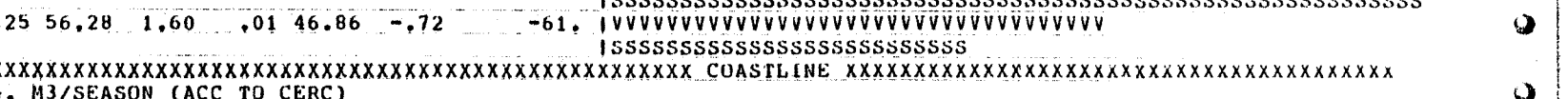
SEASON NR 20
WAVEHEIGHT 1.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF 1.38 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.14% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 2.10 M
BREAKERANGLE 3. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	1.09	.01	.58	73.36	2.42	.01	131.64	-.04	-0.	
9.17	.0246	1.11	.01	.62	72.68	2.37	.01	126.78	-.04	-0.	
8.33	.0246	1.14	.01	.67	71.94	2.31	.01	121.60	-.04	-0.	
7.50	.0246	1.16	.01	.73	71.12	2.24	.01	116.05	-.04	-1.	
6.67	.0246	1.19	.01	.80	70.20	2.17	.01	110.07	-.03	-1.	
5.83	.0075	1.23	.01	.89	69.17	2.10	.01	103.58	-.01	-0.	
5.00	.0075	1.27	.02	1.00	67.97	2.02	.01	96.50	-.11	-5.	
4.17	.0075	1.33	.02	1.15	66.57	1.92	.01	88.68	-.45	-27.	
3.33	.0160	1.39	.03	1.36	64.86	1.82	.01	79.93	-.53	-41.	
2.50	.0667	1.41	.05	1.59	62.68	1.71	.01	69.90	1.11	118.	
1.67	.0667	1.23	.09	1.69	59.75	1.62	.01	58.28	1.17	140.	
.83	.0667	.72	.29	1.25	56.28	1.60	.01	46.86	-.72	-61.	



TOTAL TRANSPORT IS 39394. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -2578. M3/SEASON (ACC TO BIJKER)

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      HYDRONAMIC BV
      PORT & WATERWAY ENGINEERS
      SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 3  *  WITH SETUP INFLUENCE
==================================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00               BREAKERINDEX= .800000
*************************************************************


SEASON NR 21
 WAVEHEIGHT  1.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION   2.00 DEGREES (AT 10.M DEPTH)
 REFR COEF   1.38 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .19% OF THE YEAR
*************************************************************



A SETUP DIFFERENCE DISTANCE OF     250M IS USED


REFRACTED WAVEHEIGHT 2.11 M
BREAKERANGLE  1. DEGREES

  D     ALFA   H    SETUP   U1    C      KSI    R     L         V        S
10.00 .0246  1.10   .01    .58 73.36  2.42   .01131.64  -.01         -0. |V
                                                                         |S
 9.17 .0246  1.12   .01    .62 72.68  2.36   .01126.79  -.01         -0. |V
                                                                         |S
 8.33 .0246  1.14   .01    .67 71.94  2.30   .01121.60  -.01         -0. |V
                                                                         |S
 7.50 .0246  1.17   .01    .73 71.12  2.24   .01116.05  -.01         -0. |V
                                                                         |S
 6.67 .0246  1.20   .01    .80 70.20  2.17   .01110.07  -.01         -0. |V
                                                                         |S
 5.83 .0075  1.24   .02    .89 69.17  2.10   .01103.58   .00          0. |V
                                                                         |S
 5.00 .0075  1.28   .02   1.01 67.97  2.01   .01 96.50  -.14         -1. |VVVV
                                                                         |S
 4.17 .0075  1.34   .03   1.16 66.57  1.92   .01 88.69  -.50         -3. |VVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSS
 3.33 .0160  1.40   .03   1.37 64.86  1.82   .01 79.94  -.74         -5. |VVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSS
 2.50 .0667  1.41   .05   1.60 62.68  1.71   .01 69.91  -.56         -5. |VVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSS
 1.67 .0667  1.23   .09   1.69 59.76  1.62   .01 58.29  -.64         -6. |VVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSS
  .83 .0667   .72   .29   1.25 56.30  1.60   .01 46.92 -1.66        -19. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                         |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS       714. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS      -939. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

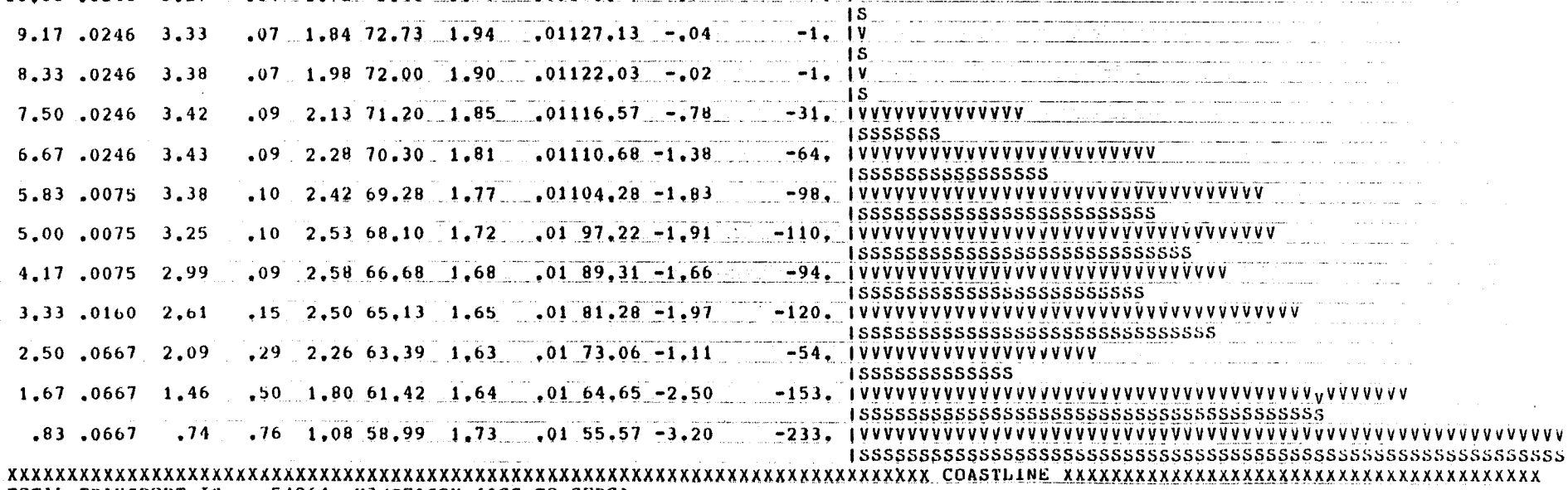
SEASON NR 22
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF .81 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .76% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.31 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.27	.06	1.72	73.40	1.98	.01	131.93	-.05	-2.	
9.17	.0246	3.33	.07	1.84	72.73	1.94	.01	127.13	-.04	-1.	
8.33	.0246	3.38	.07	1.98	72.00	1.90	.01	122.03	-.02	-1.	
7.50	.0246	3.42	.09	2.13	71.20	1.85	.01	116.57	-.78	-31.	
6.67	.0246	3.43	.09	2.28	70.30	1.81	.01	110.68	-1.38	-64.	
5.83	.0075	3.38	.10	2.42	69.28	1.77	.01	104.28	-1.83	-98.	
5.00	.0075	3.25	.10	2.53	68.10	1.72	.01	97.22	-1.91	-110.	
4.17	.0075	2.99	.09	2.58	66.68	1.68	.01	89.31	-1.66	-94.	
3.33	.0160	2.61	.15	2.50	65.13	1.65	.01	81.28	-1.97	-120.	
2.50	.0667	2.09	.29	2.26	63.39	1.63	.01	73.06	-1.11	-54.	
1.67	.0667	1.46	.50	1.80	61.42	1.64	.01	64.65	-2.50	-153.	
.83	.0667	.74	.76	1.08	58.99	1.73	.01	55.57	-3.20	-233.	



TOTAL TRANSPORT IS 54264. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -46415. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 23
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 15.00 DEGREES (AT 10.M DEPTH)
REFR COEF .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 8.23% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.32 M
BREAKERANGLE 7. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.25	.06	1.71	73.40	1.98	.01	131.92	-.08	-25.	
9.17	.0246	3.30	.06	1.83	72.73	1.94	.01	127.13	-.06	-20.	
8.33	.0246	3.35	.07	1.97	72.00	1.90	.01	122.02	-.01	-6.	
7.50	.0246	3.39	.08	2.11	71.20	1.85	.01	116.56	-.76	-326.	
6.67	.0246	3.41	.09	2.27	70.30	1.81	.01	110.67	-1.30	-641.	
5.83	.0075	3.36	.10	2.41	69.28	1.77	.01	104.27	-1.77	-1017.	
5.00	.0075	3.23	.10	2.52	68.10	1.73	.01	97.22	-1.81	-1110.	
4.17	.0075	2.99	.09	2.57	66.68	1.68	.01	89.30	-1.51	-908.	
3.33	.0160	2.61	.16	2.50	65.13	1.65	.01	81.30	-1.68	-1040.	
2.50	.0667	2.09	.29	2.26	63.40	1.63	.01	73.09	.85	430.	
1.67	.0667	1.46	.50	1.80	61.43	1.64	.01	64.70	-1.54	-776.	
.83	.0667	.74	.76	1.08	59.01	1.73	.01	55.63	-2.73	-1780.	

TOTAL TRANSPORT IS 971086. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -429716. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

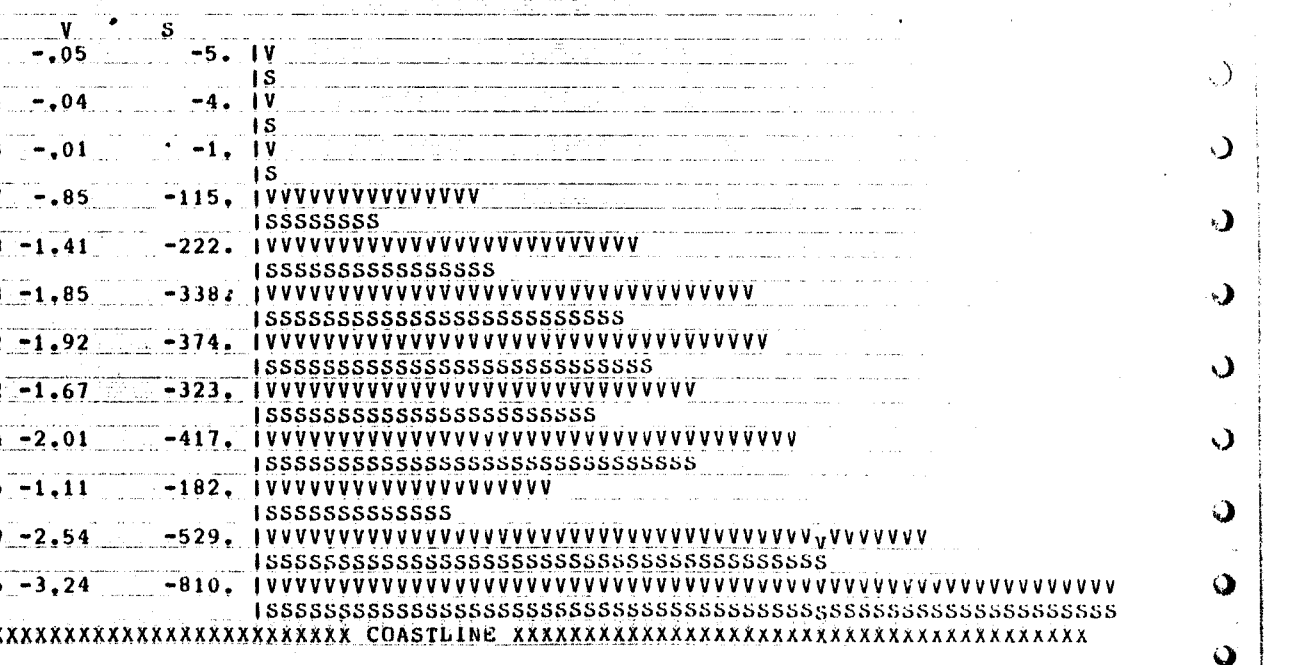
SEASON NR 24
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF .84 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 2.56% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.35 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.27	.06	1.72	73.40	1.98	.01	131.93	-.05	-5.	
9.17	.0246	3.33	.07	1.84	72.73	1.94	.01	127.14	-.04	-4.	
8.33	.0246	3.38	.07	1.98	72.00	1.90	.01	122.03	-.01	-1.	
7.50	.0246	3.42	.09	2.13	71.20	1.85	.01	116.57	-.85	-115.	
6.67	.0246	3.43	.09	2.28	70.30	1.81	.01	110.68	-1.41	-222.	
5.83	.0075	3.38	.10	2.42	69.28	1.77	.01	104.28	-1.85	-338.	
5.00	.0075	3.25	.10	2.53	68.10	1.72	.01	97.22	-1.92	-374.	
4.17	.0075	2.99	.09	2.58	66.68	1.68	.01	89.32	-1.67	-323.	
3.33	.0160	2.61	.16	2.50	65.14	1.65	.01	81.34	-2.01	-417.	
2.50	.0667	2.09	.30	2.26	63.41	1.64	.01	73.15	-1.11	-182.	
1.67	.0667	1.46	.51	1.79	61.45	1.64	.01	64.79	-2.54	-529.	
.83	.0667	.74	.77	1.07	59.05	1.73	.01	55.76	-3.24	-810.	



TOTAL TRANSPORT IS 206624. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -159375. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 3  *  WITH SETUP INFLUENCE
================================================================================================================

PHYSICAL CONSTANTS  G=    9.81      COASTAL CONSTANTS D50= .000950
                  RHO=1027.00                         D90= .001600
                KAPPA=     .38                      DELTA=1.650000
          TEMPERATURE=  15.00                BREAKERINDEX= .800000
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SEASON NR 25
 WAVEHEIGHT  3.00 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION   2.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .82 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING    .23% OF THE YEAR
*********************************************************



A SETUP DIFFERENCE DISTANCE OF    250M IS USED


REFRACTED WAVEHEIGHT 3.29 M
BREAKERANGLE  1. DEGREES

  D    ALFA   H    SETUP   U1   C    KSI   R    L        V       S
10.00 .0246  3.29   .06  1.73 73.40  1.98  .01131.93  -.01     -0. |V
                                                                   |S
 9.17 .0246  3.34   .07  1.85 72.73  1.94  .01127.14  -.01     -0. |V
                                                                   |S
 8.33 .0246  3.40   .08  1.99 72.00  1.89  .01122.03  -.00     -0. |V
                                                                   |S
 7.50 .0246  3.43   .09  2.14 71.20  1.85  .01116.57  -.75     -9. |VVVVVVVVVVV
                                                                   |SSSS
 6.67 .0246  3.44   .10  2.29 70.30  1.81  .01110.69 -1.44    -20. |VVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSS
 5.83 .0075  3.39   .10  2.43 69.28  1.77  .01104.29 -1.87    -31. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSS
 5.00 .0075  3.26   .10  2.54 68.10  1.72  .01 97.23 -2.00    -36. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSS
 4.17 .0075  3.00   .09  2.59 66.68  1.68  .01 89.31 -1.82    -33. |VVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSS
 3.33 .0160  2.61   .15  2.51 65.12  1.65  .01 81.25 -2.34    -47. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSS
 2.50 .0667  2.09   .29  2.26 63.38  1.63  .01 73.00 -2.85    -65. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 1.67 .0667  1.46   .50  1.80 61.40  1.64  .01 64.57 -3.55    -99. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  .83 .0667   .74   .75  1.08 58.96  1.72  .01 55.46 -3.83   -114. |VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS     3608. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS   -17155. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE
===

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000
****

SEASON NR 26
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION -19.00 DEGREES (AT 10.M DEPTH)
REFR COEF .81 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .11% OF THE YEAR
****

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.25 M
BREAKERANGLE -8. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.22	.06	1.69	73.40	1.98	.01	131.92	.09	0.	IV IS
9.17	.0246	3.27	.06	1.81	72.73	1.94	.01	127.12	.07	0.	IV IS
8.33	.0246	3.32	.07	1.95	72.00	1.90	.01	122.01	.04	0.	IV IS
7.50	.0246	3.37	.08	2.10	71.20	1.86	.01	116.55	-.69	-4.	IVVVVVVV IS
6.67	.0246	3.38	.09	2.25	70.30	1.81	.01	110.66	-1.52	-10.	IVVVVVVVVVVVVVVVVV ISSS
5.83	.0075	3.34	.10	2.40	69.28	1.77	.01	104.26	-1.91	-15.	IVVVVVVVVVVVVVVVVVVVVVV ISSSS
5.00	.0075	3.22	.10	2.51	68.10	1.73	.01	97.21	-2.18	-19.	IVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSS
4.17	.0075	2.98	.09	2.56	66.68	1.69	.01	89.30	-2.17	-20.	IVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSS
3.33	.0160	2.60	.15	2.50	65.11	1.65	.01	81.19	-3.11	-39.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSS
2.50	.0667	2.09	.28	2.26	63.36	1.63	.01	72.92	-5.29	-174.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV,VVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.46	.49	1.80	61.37	1.64	.01	64.45	-5.41	-184.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.74	1.08	58.92	1.72	.01	55.30	-5.11	-144.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS -14138. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -14244. M3/SEASON (ACC TO BIJKER)

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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND


CALCULATION OF LONGSHORE TRANSPORT  *  DOURO ESTUARY  *  TRANSPORT IN PROFILE 3  *  WITH SETUP INFLUENCE
==========================================================================================================

PHYSICAL CONSTANTS  G=   9.81      COASTAL CONSTANTS D50= .000950
                 RHO=1027.00                         D90= .001600
               KAPPA=    .38                       DELTA=1.650000
         TEMPERATURE=  15.00                BREAKERINDEX= .800000
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SEASON NR 27
 WAVEHEIGHT  4.50 M (HRMS IN DEEP WATER)
 PERIOD     12.00 SEC
 DIRECTION  10.00 DEGREES (AT 10.M DEPTH)
 REFR COEF    .53 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING     .12% OF THE YEAR
************************************************************



A SETUP DIFFERENCE DISTANCE OF    250M IS USED


REFRACTED WAVEHEIGHT 3.26 M
BREAKERANGLE  4. DEGREES

   D    ALFA   H    SETUP   U1    C    KSI    R     L      V       S
 10.00 .0246  4.77   .12  2.50 73.45  1.86  .01132.25  -.04       -0. IV
                                                                      IS
  9.17 .0246  4.76   .12  2.63 72.78  1.83  .01127.48  -.03       -0. IV
                                                                      IS
  8.33 .0246  4.71   .13  2.75 72.05  1.80  .01122.36  -.02       -0. IV
                                                                      IS
  7.50 .0246  4.60   .13  2.86 71.24  1.77  .01116.85  -.73       -6. IVVVVVVVVVVVVV
                                                                      ISSSSSSSSS
  6.67 .0246  4.42   .12  2.93 70.33  1.74  .01110.88 -1.40      -13. IVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSS
  5.83 .0075  4.15   .11  2.97 69.29  1.71  .01104.34 -1.70      -17. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSSSSSS
  5.00 .0075  3.79   .09  2.96 68.08  1.68  .01 97.12 -1.56      -16. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSSSS
  4.17 .0075  3.34   .06  2.89 66.64  1.65  .01 89.08 -1.13      -10. IVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSS
  3.33 .0160  2.79   .17  2.67 65.16  1.64  .01 81.41 -2.09      -22. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
  2.50 .0667  2.17   .33  2.32 63.50  1.63  .01 73.55 -1.69      -15. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSS
  1.67 .0667  1.47   .54  1.80 61.54  1.65  .01 65.15 -2.76      -29. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
   .83 .0667   .74   .76  1.07 59.02  1.73  .01 55.66 -3.23      -38. IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
                                                                      ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
TOTAL TRANSPORT IS      8191. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS     -7406. M3/SEASON (ACC TO BIJKER)
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HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

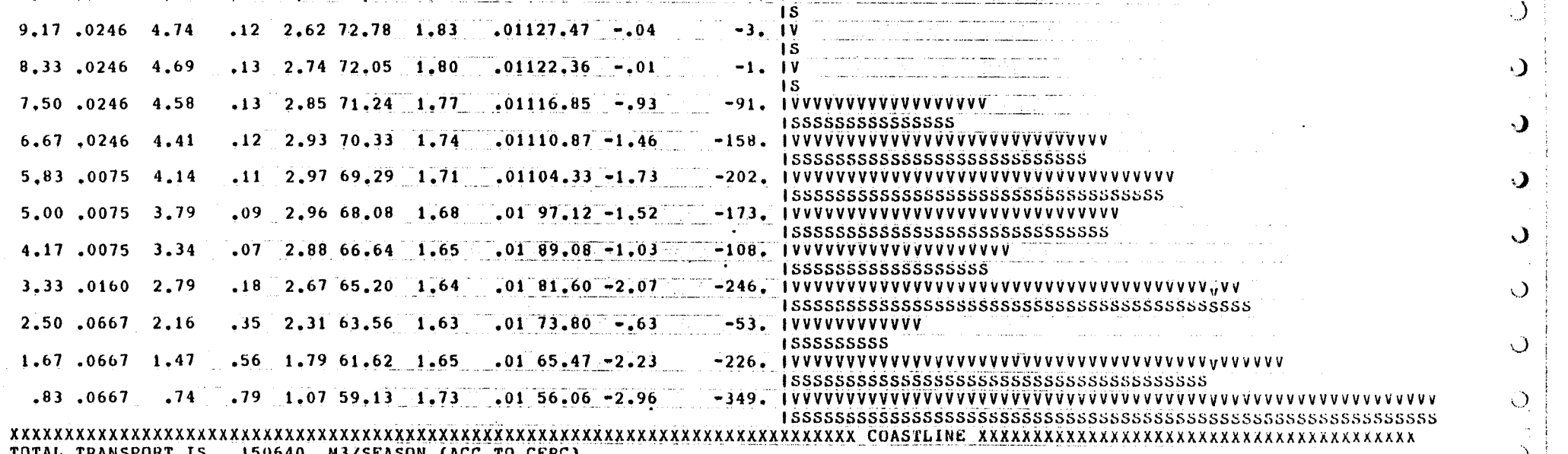
SEASON NR 28
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 14.00 DEGREES (AT 10.M DEPTH)
REFR COEF .56 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING 1.37% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.34 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	4.74	.11	2.49	73.45	1.86	.01	132.25	-.05	-4.	
9.17	.0246	4.74	.12	2.62	72.78	1.83	.01	127.47	-.04	-3.	
8.33	.0246	4.69	.13	2.74	72.05	1.80	.01	122.36	-.01	-1.	
7.50	.0246	4.58	.13	2.85	71.24	1.77	.01	116.85	-.93	-91.	
6.67	.0246	4.41	.12	2.93	70.33	1.74	.01	110.87	-1.46	-158.	
5.83	.0075	4.14	.11	2.97	69.29	1.71	.01	104.33	-1.73	-202.	
5.00	.0075	3.79	.09	2.96	68.08	1.68	.01	97.12	-1.52	-173.	
4.17	.0075	3.34	.07	2.88	66.64	1.65	.01	89.08	-1.03	-108.	
3.33	.0160	2.79	.18	2.67	65.20	1.64	.01	81.60	-2.07	-246.	
2.50	.0667	2.16	.35	2.31	63.56	1.63	.01	73.80	-.63	-53.	
1.67	.0667	1.47	.56	1.79	61.62	1.65	.01	65.47	-2.23	-226.	
.83	.0667	.74	.79	1.07	59.13	1.73	.01	56.06	-2.96	-349.	



TOTAL TRANSPORT IS 150640. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -80310. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

SEASON NR 29
WAVEHEIGHT 4.50 M (HRMS IN DEEP WATER)
PERIOD 12.00 SEC
DIRECTION 10.00 DEGREES (AT 10.M DEPTH)
REFR COEF .56 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .43% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.36 M
BREAKERANGLE 4. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	4.77	.12	2.50	73.45	1.86	.01	132.25	-.04	-1.	IV
											IS
9.17	.0246	4.76	.12	2.63	72.78	1.83	.01	127.48	-.03	-1.	IV
											IS
8.33	.0246	4.71	.13	2.75	72.05	1.80	.01	122.36	-.01	-0.	IV
											IS
7.50	.0246	4.60	.13	2.86	71.24	1.77	.01	116.85	-1.01	-31.	IVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSS
6.67	.0246	4.42	.12	2.93	70.33	1.74	.01	110.88	-1.55	-53.	IVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSS
5.83	.0075	4.15	.11	2.97	69.29	1.71	.01	104.34	-1.79	-66.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSS
5.00	.0075	3.79	.09	2.96	68.08	1.68	.01	97.12	-1.60	-58.	IVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSS
4.17	.0075	3.34	.07	2.88	66.65	1.65	.01	89.12	-1.22	-41.	IVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSS
3.33	.0160	2.79	.19	2.67	65.21	1.64	.01	81.65	-2.32	-92.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
2.50	.0667	2.17	.36	2.31	63.57	1.63	.01	73.86	-1.86	-60.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSS
1.67	.0667	1.47	.56	1.79	61.64	1.65	.01	65.55	-2.91	-116.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
.83	.0667	.74	.79	1.06	59.16	1.73	.01	56.16	-3.36	-147.	IVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
											ISSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX COASTLINE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TOTAL TRANSPORT IS 34446. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -29130. M3/SEASON (ACC TO BIJKER)

HYDRONAMIC BV
PORT & WATERWAY ENGINEERS
SLIEDRECHT-HOLLAND

CALCULATION OF LONGSHORE TRANSPORT * DOURO ESTUARY * TRANSPORT IN PROFILE 3 * WITH SETUP INFLUENCE

PHYSICAL CONSTANTS G= 9.81 COASTAL CONSTANTS D50= .000950
RHO=1027.00 D90= .001600
KAPPA= .38 DELTA=1.650000
TEMPERATURE= 15.00 BREAKERINDEX= .800000

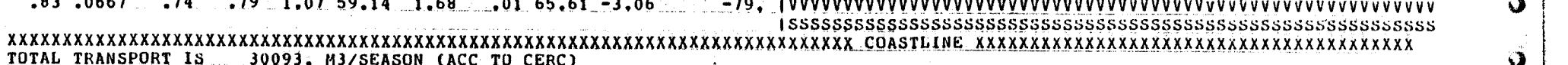
SEASON NR 30
WAVEHEIGHT 3.00 M (HRMS IN DEEP WATER)
PERIOD 14.00 SEC
DIRECTION 13.00 DEGREES (AT 10.M DEPTH)
REFR COEF .80 (AT 10.M DEPTH)

THIS WAVE CLIMATE OCCURS DURING .29% OF THE YEAR

A SETUP DIFFERENCE DISTANCE OF 250M IS USED

REFRACTED WAVEHEIGHT 3.41 M
BREAKERANGLE 6. DEGREES

D	ALFA	H	SETUP	U1	C	KSI	R	L	V	S	
10.00	.0246	3.48	.07	1.88	73.41	1.90	.01	156.88	-.05	-1.	
9.17	.0246	3.54	.08	2.01	72.74	1.86	.01	150.95	-.03	-0.	
8.33	.0246	3.59	.09	2.15	72.01	1.83	.01	144.68	-.15	-2.	
7.50	.0246	3.62	.10	2.30	71.21	1.79	.01	138.00	-1.06	-17.	
6.67	.0246	3.61	.11	2.45	70.32	1.75	.01	130.84	-1.60	-31.	
5.83	.0075	3.54	.11	2.58	69.30	1.71	.01	123.09	-2.05	-45.	
5.00	.0075	3.37	.11	2.66	68.11	1.67	.01	114.58	-2.05	-48.	
4.17	.0075	3.08	.10	2.68	66.71	1.64	.01	105.16	-1.84	-42.	
3.33	.0160	2.66	.17	2.57	65.17	1.61	.01	95.65	-1.99	-46.	
2.50	.0667	2.12	.31	2.29	63.45	1.59	.01	85.97	-.11	-2.	
1.67	.0667	1.47	.53	1.81	61.51	1.60	.01	76.15	-2.13	-44.	
.83	.0667	.74	.79	1.07	59.14	1.68	.01	65.61	-3.06	-79.	



TOTAL TRANSPORT IS 30093. M3/SEASON (ACC TO CERC)
TOTAL TRANSPORT IS -19644. M3/SEASON (ACC TO BIJKER)

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 TOTAL TRANSPORT -1483484.M3/YEAR
 NEGAT TRANSPORT -1532889.M3/YEAR
 POSIT TRANSPORT    49405.M3/YEAR
 DOMINANT NEGAT WAVE DIRECTION    5.
 DOMINANT POSIT WAVE DIRECTION    5.
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