

**Extension of estuary foreshore reclamation
associated with construction of the Dawesville
Channel - change of environmental condition**

Department of Marine and Harbours

**Report and recommendation
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
Bulletin 640
August 1992**

ISBN 0 7309 4716 5
ISSN 1030 - 0120
Assessment Number 702

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's recommendations.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the assessment report recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of \$10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
18th Floor, Allendale Square
77 St George's Terrace
PERTH WA 6000

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 21 August 1992.

Contents

	Page
1. Background	1
2. Proposed change to environmental condition	1
3. Assessment of proposed change	2
4. References	5

Figure

1. Proposed change to area of estuary reclamation, as indicated by the Department of Marine and Harbours in July 1992	3
---	---

Appendices

1. Environmental conditions for Peel Inlet and Harvey Estuary Management Strategy Stage II ERMP
2. Letter from the Department of Marine and Harbours of 8 January 1992 regarding changes to reclamation area within the Harvey Estuary
3. Letter from the Department of Marine and Harbours of 6 July 1992 regarding amendments to proposed reclamation of January 1992
4. Letter from the Department of Marine and Harbours of 31 July 1992, detailing proposed landscape plan for the reclamation area

1. Background

Pursuant to Section 46 (1) of the Environmental Protection Act, the Minister for the Environment has requested the Environmental Protection Authority to inquire and report on the modifications to the proposal for the extension of foreshore reclamation in the Peel Inlet — Harvey Estuary associated with the construction of the Dawesville Channel.

A report describing the area of foreshore reclamation was included within the 'Peel Inlet and Harvey Estuary Management Strategy — Environmental Review and Management Programme Stage 2' (ERMP), which was assessed by the Environmental Protection Authority in November 1988. Following assessment of the ERMP by the Environmental Protection Authority, (published as EPA Bulletin 363), the Minister for the Environment issued a statement "that the proposal can be implemented" on 4 January 1989. These Conditions were subsequently modified on 2 October 1991 (Appendix 1).

The Minister's statement contained a Condition which requires the proponent to prepare a dredging and spoil disposal management plan for the Dawesville Channel to the satisfaction of the Environmental Protection Authority. Further, dredging not already forming part of the proposal as assessed in the Stage 2 ERMP shall be the subject of separate assessment by the Environmental Protection Authority (Condition 7).

The proponent has already commenced work on the 'Dredge Spoil and Disposal Management Plan', which is to be prepared in four stages.

Stage 1: Refers to work associated with the construction of breakwaters at the ocean end of the Channel, which involved the clearing and removal of dunes at the western end of the Channel alignment. This was submitted to the Authority in January 1992.

Stage 2: Refers to earthworks associated with the dry land (on-shore) excavation of the Channel, using conventional land based equipment. Submitted to the Authority in March 1992.

Stage 3: This stage is proposed to address earthworks associated with dredging and reclamation proposed adjacent to the estuary foreshore, and has yet to be referred.

Stage 4: This stage is anticipated to address the long term monitoring details associated with any aspects of spoil disposal and management.

2. Proposed change to environmental condition

On 8 January 1992 the Department of Marine and Harbours submitted a letter to the Environmental Protection Authority which states that the extent of the reclamation proposed within the Harvey Estuary has changed from that originally proposed within the Stage 2 ERMP in 1988 (Appendix 2).

The original area of reclamation originally agreed to by the Environmental Protection Authority in 1988 was 10 hectares (ha); six to the north of the Channel entrance to the estuary, and four to the south. The increase in estuary reclamation proposed in January 1992 would involve an additional area of 26ha, making a total of 36ha of reclamation; 22ha to the north of the Channel entrance to the estuary, and 14ha to the south of the entrance.

The following reasons were given for the extended reclamation:

- to extend the estuary training walls into deeper waters of the estuary to optimise the Channel flushing characteristics and reduce potential siltation;
- to ensure the availability of adequate spoil disposal area (in view of the fact that spoil can not now be accommodated on private land adjacent to the Channel to the degree anticipated in 1988); and

- to provide an additional area of public open space as this area will become a major focal point for the future local population.

Subsequent discussion and correspondence between officers of the Department of Marine and Harbours and the Environmental Protection Authority since January 1992 has resulted in an amendment to the proposed extent of reclamation. Advice received from the Department of Marine and Harbours in July 1992 notes that the reclamation can be reduced to a total area of 25ha, which represents a reduction in area of 11ha. However, the length of the proposed estuary training walls are proposed to be retained to ensure that maximum flushing characteristics between the Channel and estuary are retained (Appendix 3). The extent of proposed reclamation is indicated in Figure 1.

Final land use of the reclamation is proposed to be used as follows:

- 5ha of land on the northern side of the Channel entrance to be granted to Wannunup Development Nominees as part of a land exchange incorporated in a "Total Construction Package" agreement between Wannunup and the Western Australian Government. This involves the granting of a parcel of land to the Company in exchange for land previously owned by Wannunup on the Dawesville Channel site; and
- approximately 5ha of land on the northern side to be occupied by a public marina and boat launching area, to be developed by the Department of Marine and Harbours.

Details of the final land use, public facilities, and proposed revegetation programmes were forwarded to the Environmental Protection Authority 31 July 1992 (Appendix 4). This land use plan provides for two options for development of the reclamation area.

Option A: Plans assume that a canal estate would be constructed on a portion of the reclamation area, and includes provision for a public marina, boat launching ramp and public open space. The Option includes the reclamation of 25ha of estuary, plus an area of 4.5ha for an artificial waterway proposed to be included as part of a future canal estate.

Option B: Plans include provision for the public marina, with the remaining area retained for public open space. A total reclamation of 25ha of estuary is proposed.

3. Assessment of proposed change

Environmental implications associated with this change to the extent of reclamation include the loss of existing estuary foreshore and associated estuarine vegetation, and potential alterations to the hydraulic and flushing characteristics of the Channel and estuary.

The Environmental Protection Authority considers that the proposed additional dredging of the estuary to deeper water is likely to increase and maximise hydraulic and flushing characteristics of the Channel as the dredged area is now proposed to extend to the deepest point of the estuary.

In view of the magnitude of the proposed increase in reclamation and the likely public interest in the proposed increase in reclamation, the Environmental Protection Authority requested the Department of Marine and Harbours to hold a 'Public Information Day' to inform interested local residents of the proposed change.

This 'Information Day' was advertised in the local press and held at the offices of the Peel Inlet Management Authority, Mandurah on Saturday 13 June 1992. Officers of the Department of Marine and Harbours, Environmental Protection Authority and Peel Inlet Management Authority were present to explain the proposal and answer any questions raised by interested members of the public. Approximately 60 -70 people attended, including representatives from

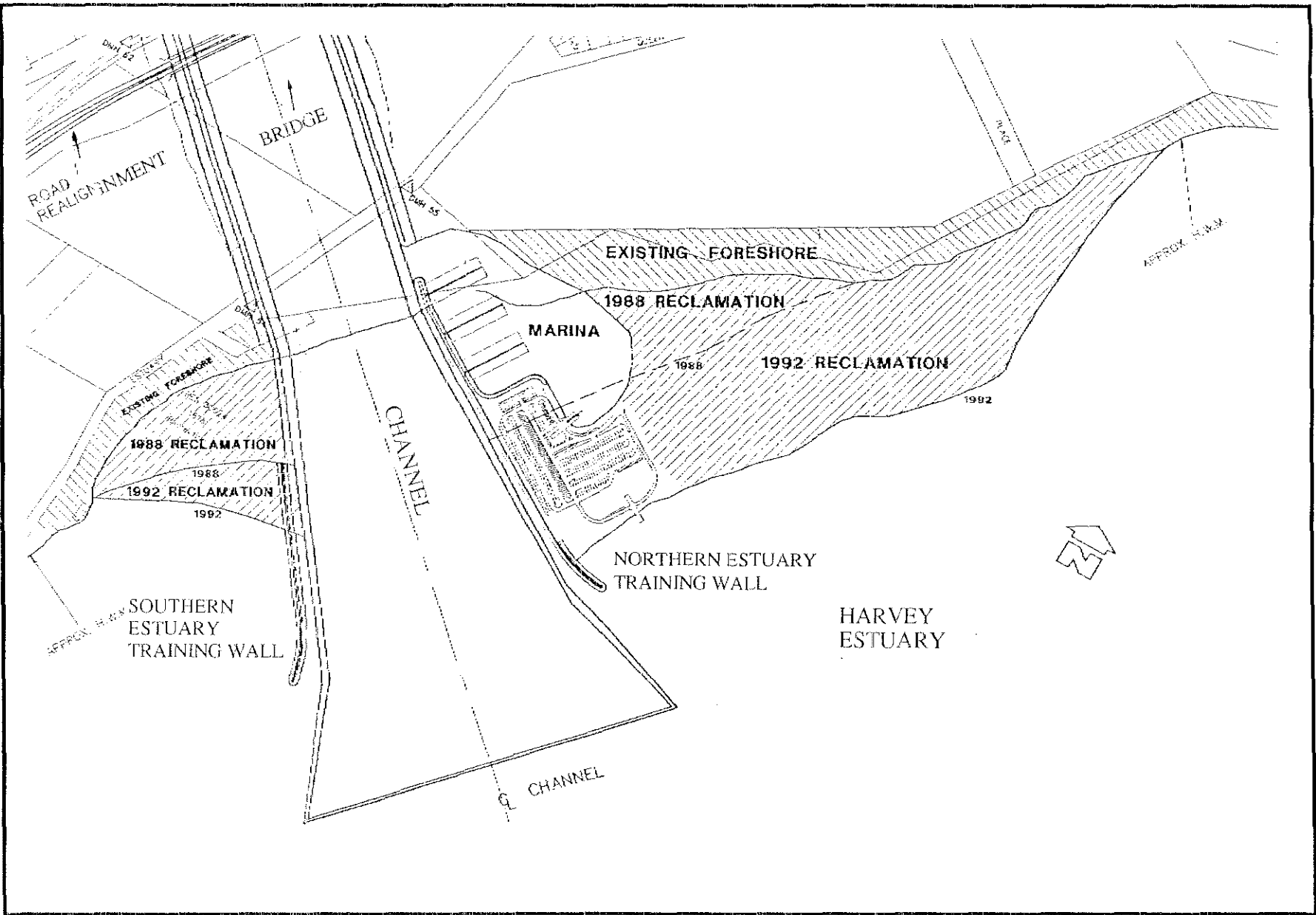


Figure 1. Proposed change to estuary reclamation, as indicated by the Department of Marine and Harbours in July 1992

local conservation groups. Approximately 15% of people who attended the meeting expressed opposition in principle to any reclamation of the foreshore.

The Environmental Protection Authority is of the view that the reduction in area of reclamation as proposed by the Department of Marine and Harbours in July 1992 of 11ha is a more acceptable proposal in terms of environmental impact on the estuary.

The Authority considers that the proposed increase in estuary reclamation for spoil disposal to a maximum of 25ha is acceptable, provided the proponent undertakes the following:

- a commitment to minimise the area of estuary reclamation and to reduce it below the nominated area of 25ha if possible;
- a commitment to retain existing foreshore vegetation where possible. In particular existing Casuarina, Paperbark and Tuart stands along the existing foreshore should be retained outside the proposed Channel alignment;
- the adherence to all appropriate recommendations from the Peel Inlet Management Programme (1992) pertinent to the area; and
- details of the proposed landscape and use of the reclamation area (including final fill levels, revegetation and details of public access) be included within Stage 3 of the 'Dredge and Spoil Disposal Management Plan'.

The Authority believes that the land created by the proposed reclamation, with the exception of 5ha included as part of the existing land exchange agreement with Wannunup Development Nominees Pty Ltd, should be retained in public ownership for the purposes of public recreation. The Authority believes that the total intrusion into the estuary should be minimised as far as possible, and therefore favours Option B proposed by the Department of Marine and Harbours.

Recommendation 1

The Environmental Protection Authority considers that the amended proposal is environmentally acceptable, subject to the following:

- **the total area of estuary reclaimed should not exceed 25 hectares, and should be reduced further if possible by increasing the height of the spoil consistent with potential recreational use of the reclaimed land;**
- **foreshore vegetation should be retained where possible. In particular, existing Casuarina, Paperbark and Tuart stands along the existing foreshore should be retained outside the proposed channel alignment; and**
- **total intrusion into the estuary is minimised by the exclusion of a canal estate on the reclaimed land. Therefore, the Landscape Concept Plan Option B as proposed by the Department of Marine and Harbours is considered to be more acceptable.**

Accordingly, the Environmental Protection Authority recommends that the Minister for the Environment approves the amended proposal by the Department of Marine and Harbours regarding the proposed increase in estuary reclamation, subject to the above conditions.

Where, in the course of detailed implementation of the proposal, the proponent seeks to change those designs, specifications, plans or technical material in any way that the Minister for the Environment determines on advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

4. References

ERMP (1988) Peel Inlet and Harvey Estuary Management Strategy - Environmental Review and Management Programme Stage 2. Kinhill Engineers Pty Ltd (May 1988)

Peel Inlet Management Authority (1992) Peel Inlet Management Programme. Waterways Commission Report No. 30 (1992)

Appendix 1

**Environmental conditions for Peel Inlet and Harvey Estuary
Management Strategy Stage II ERMP**



MINISTER FOR ENVIRONMENT

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

PEEL INLET-HARVEY ESTUARY MANAGEMENT STRATEGY - STAGE 2

MINISTER FOR TRANSPORT
MINISTER FOR AGRICULTURE
MINISTER FOR WATERWAYS

This proposal may be implemented subject to the following conditions:

1. The proponents shall adhere to the proposal as assessed by the Environmental Protection Authority and shall fulfil the commitments made and listed in Appendix 2 of Environmental Protection Authority Bulletin 363, as amended (copy of commitments attached).
2. The proponents shall develop proposals for control of phosphorus through catchment management, to the satisfaction of the Environmental Protection Authority, and shall implement them as rapidly as possible so that, in conjunction with the Davesville Channel, the following objective is met:

the Peel-Harvey System becomes clean, healthy and resilient.

To achieve this objective, the following interim targets should be used:

- (1) annual phosphorus input to the system shall not exceed 85 tonnes in more than four years out of ten (on average) and shall not exceed 165 tonnes in more than one year out of ten (on average). [These are based on 60 and 90 percentile loads]; and
- (2) average phosphorus concentration in estuary water shall not exceed 0.2 milligrams per litre in nine years out of ten (on average).

Published on

4 JAN 1986

These target figures shall be reviewed by the Environmental Protection Authority after 3 years or sooner if environmental conditions dictate, in the light of measured performance of the System and may subsequently be varied by the Environmental Protection Authority.

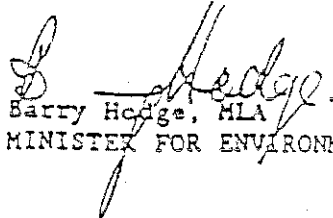
3. The proponents shall jointly prepare an Environmental Protection Policy for the Peel-Harvey catchment in consultation with such persons and agencies as Government may specify, to the satisfaction of the Environmental Protection Authority, in accordance with the objective and targets specified in Condition 2 above. The target date for the Draft Policy (under Section 26 of the Environmental Protection Act 1986) is 31 December 1989.
4. The proponents shall develop in consultation with such persons and agencies as Government may specify, an integrated catchment management plan designed to meet the objective and targets specified in Condition 2 above, to the satisfaction of the Environmental Protection Authority, and which shall be in accordance with the principles to be developed in the Environmental Protection Policy for the area pursuant to Condition 3. The target date for the implementation of the integrated catchment management plan shall be 31 December 1990.
5. The proponents shall ensure that the moratorium on clearing and drainage in the Peel-Harvey coastal plain catchment proposed in the Stage 2 Environmental Review and Management Programme (Commitment 3.6) continues until the Minister for Environment is satisfied that these activities would be environmentally acceptable.
6. Relevant decision-making authorities shall ensure that all developments within 2 kilometres of the Peel-Harvey Estuary System (as defined in the Estuarine and Marine Advisory Committee Report to the Environmental Protection Authority, Department of Conservation and Environment Bulletin 88, March 1981.) include appropriate nutrient-attenuating waste disposal systems and management practices, to the satisfaction of the Environmental Protection Authority.
7. Prior to construction, a dredging and spoil disposal management plan for the Dawesville Channel shall be prepared by the proponents, to the satisfaction of the Environmental Protection Authority. Dredging not already forming part of the proposals in the Stage 2 Environmental Review and Management Programme shall be the subject of separate assessment by the Environmental Protection Authority.
8. The proponents shall ensure that weed harvesting and control is continued and increased as necessary to manage the expected initial increase in the occurrence of nuisance macroalgae.

9. Decisions on developments which may release phosphorus or nitrogen to the environment in the Peel-Harvey Estuary area and coastal plain catchment area should be conservative until the new assimilative capacity of the Peel-Harvey Estuary System is determined and the effects of the management elements have been measured or are being managed. To this end, such proposals for development in these areas shall be referred to the Environmental Protection Authority for assessment. These developments include new and expansion of existing intensive horticultural and intensive animal industries.
10. The Peel-Harvey regional park concept, as originally proposed in the System 6 Redbook report (Conservation Reserves for Western Australia: The Darling System - System 6, Department of Conservation and Environment Report 13, Parts I and II, October 1983.) shall be implemented within such time as to be determined by the Minister for Environment.
11. If the Dawesville Channel is constructed, the proponents shall be responsible for ensuring that mosquito management is effective and is carried out in an environmentally acceptable manner, to the satisfaction of the Minister for Environment and the Minister for Health.
12. The proponents shall be jointly responsible for the environmental aspects of:
 - (1) the construction, operation, monitoring and maintenance of the Dawesville Channel and its impacts within the estuaries and within the immediate marine environment;
 - (2) the management and required monitoring of the catchment, and collection of data necessary for the development of the integrated catchment management plan for the Peel-Harvey catchment; and
 - (3) all in-estuary monitoring and management, including weed harvesting.

All of the above shall be carried out to the satisfaction of the Environmental Protection Authority.


13. Prior to the construction of the Dawesville Channel, the proponents shall prepare in stages, a monitoring and management programme, to the satisfaction of the Environmental Protection Authority. This programme shall include:
 - (1) essential additional baseline monitoring required to be in place as soon as possible and prior to construction commencing;

- 4.
- (2) construction stage impacts and monitoring, prior to construction; and
 - (3) operational and long-term monitoring, in stages, to be determined by the Environmental Protection Authority.


Barry Hodge, MLA
MINISTER FOR ENVIRONMENT

14. Proposals which may release nitrogen or phosphorus to the environment shall not be referred to the Environmental Protection Authority provided that they are consistent with the draft Statement of Planning Policy for the Peel-Harvey Coastal Catchment. Proposals not consistent with the draft Statement of Planning Policy for the Peel-Harvey Coastal Catchment shall be referred to the Environmental Protection Authority.

This Condition will apply to the final Statement of Planning Policy for the Peel-Harvey Coastal Catchment when it is gazetted.


Bob Pearce, MLA
MINISTER FOR THE ENVIRONMENT

2 OCT 1991

MANAGEMENT COMMITMENTS MADE BY THE PROPONENTS

The following list has been amended by the EPA and accepted by the proponents to reflect the 'whole of Government approach' which is essential for management of this proposal.

1. DAWESVILLE CHANNEL

- . The proponents will conduct a detailed survey to locate, assess and offer protection to Aboriginal sites and heritage.
- . During construction of the Dawesville Channel, the proponents will ensure the continuity of road access, power supply, communications, and water and sewerage services that require relocation, and will minimize dust and noise impacts upon nearby residential areas.
- . Spoil from the excavated channel will be used in redeveloping the fill areas as a stable and varied landscape, reflecting naturally occurring topography elsewhere on the coastal strip.
- . The proponents will manage spoil disposal to minimize disturbance to important land elements, including coastal dunes, tree belts along Old Coast Road and near the estuary foreshore. Spoil disposed of adjacent to the undisturbed coastal dunes will be contoured to co-ordinate with natural dune topography in order to minimize the potential for erosion.
- . The land area used to dispose of excavated material will be contoured to facilitate possible future development into a prime residential and holiday area. Views from existing residences near the estuary will be retained, taking into consideration that these views may have been ultimately reduced by foreshore development and landscaping, irrespective of the proposed channel development.
- . Littoral sand drift northwards along the ocean coast will be mechanically bypassed beyond the channel entrance, to minimize siltation within the channel and to avoid adverse effects on beaches to the north and south.
- . The Dawesville Channel will be maintained as a navigable waterway, although, as with the existing Mandurah Channel, sea conditions at the ocean entrance may frequently preclude its use by small boats.
- . The estuary will be closely monitored to evaluate the management strategy's success in reducing the algal nuisance and to enable the development of appropriate management strategies to mitigate any deleterious effects that may occur. Current and proposed future monitoring studies in the estuary are described in Section 13 of the ERMP and Section 11 of the EPA assessment report.

2. CONTROL OF WEED ACCUMULATIONS

- . Weed harvesting will be continued most likely at an increased rate, until the weed nuisance in the estuary is successfully reduced.
- . Possible methods of improving the efficiency of harvesting operations, and the possible use of algicides to control weed growth, will be evaluated by the proponents and implemented if shown to be practicable.

MANAGEMENT COMMITMENTS MADE BY THE PROPONENTS (Contd)

- . The Peel Inlet Management Authority will continue the existing programme of shoreline management and will rehabilitate areas where weed accumulations or harvesting operations cause excessive retreat of the shoreline.

3. CATCHMENT MANAGEMENT

- . The proponents will continue to provide advice to farmers on fertilizer requirements, based on accurate assessment by paddock-specific soil tests.
- . The proponents will encourage further development and use of individual-nutrient fertilizers, and will undertake detailed investigations of ways to overcome existing economic constraints to their production and use.
- . The proponents will ensure that large-scale field trials are carried out to ascertain the technical and economic feasibility of converting use of sandy soils from agriculture to forestry. Private enterprise involvement in these studies will be encouraged.
- . The EPA and the Department of Agriculture will continue to provide advice to producers to define and implement practicable and cost-effective waste management strategies for control of point sources of phosphorus.
- . The Department of Agriculture will coordinate the preparation and implementation of a detailed catchment management plan aimed at reducing phosphorus losses to the estuary to less than 85 t/a in a 60 percentile year with minimal economic or social disruption to the catchment community.
- . The Department of Agriculture will implement a moratorium on further clearing and drainage in the catchment, pending determination of the success of the catchment management plan in reducing phosphorus losses from existing cleared land.
- . The success of catchment management measures in reducing phosphorus losses to the estuary will be monitored by the proponents and audited by the EPA. The social and economic effects of catchment management measures upon the catchment community will be closely monitored by the proponents. Current and proposed future monitoring studies are described in Section 13 of the ERMP and in Section 11 of the EPA assessment report. The catchment management plan will be regularly reviewed by the EPA.

Appendix 2

Letter from the Department of Marine and Harbours of 8 January
1992 regarding changes to reclamation area within the Harvey
Estuary

Your Ref:
Our Ref:
Enquiries:

RW/323/85 V3
Mr R Wallwork

DEPARTMENT OF
MARINE & HARBOURS
WESTERN AUSTRALIA

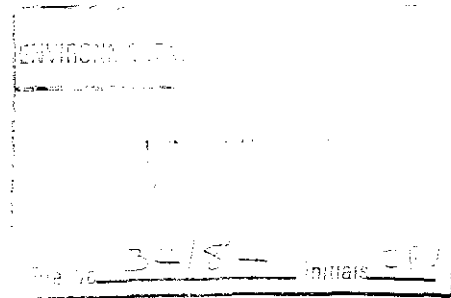


1 ESSEX ST., FREMANTLE
P.O. BOX 402 FREMANTLE, W.A. 6160
TELEPHONE (09) 335 0888
TLX: 94784 FAX: 335 0850

The Chairman
Environmental Protection Authority
BP House
1 Mount Street
PERTH WA 6000

Att: Mr C Murray

**DAWESVILLE CHANNEL PROJECT
RECLAMATION IN ESTUARY**



The extent of reclamation in the Harvey Estuary within the project has changed from that indicated in the ERMP Stage 11.

The area has been extended for the following reasons:

- * the estuary training walls have been extended into deeper water to optimise the channel characteristics and reduce potential siltation;
- * to ensure availability of adequate spoil disposal area;
- * to provide sufficient area of public open space as this will be a major focal point for the future local population.

A plan and overlay are enclosed to show the original approved reclamation and the new proposal, which I submit for your consideration.


N SIRAGUSA
PROJECT MANAGER

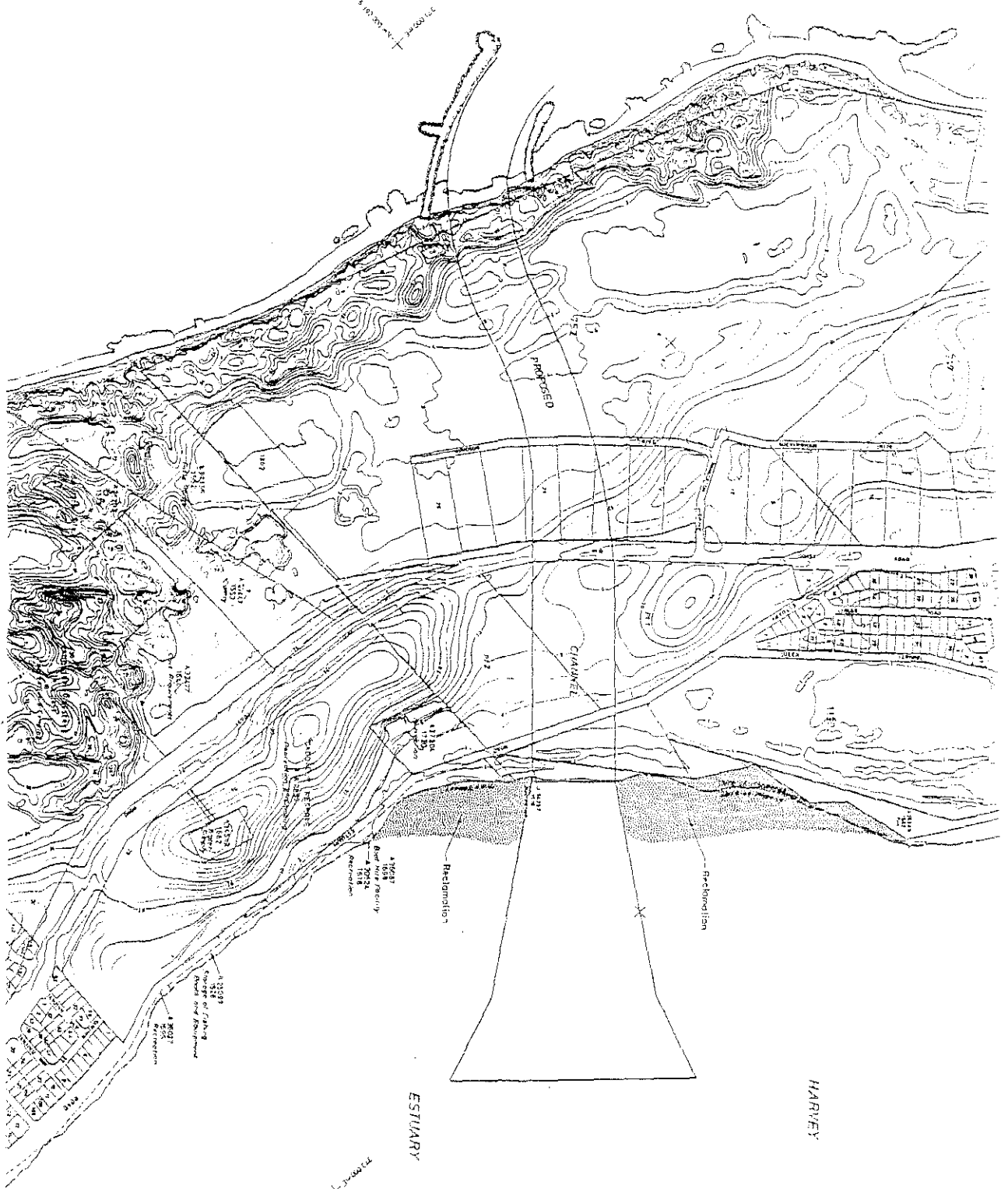
8 January 1992

(c08arw.st)

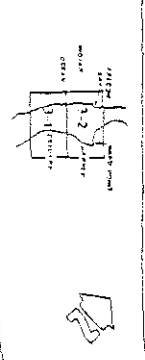
50162

INDIAN

OCEAN



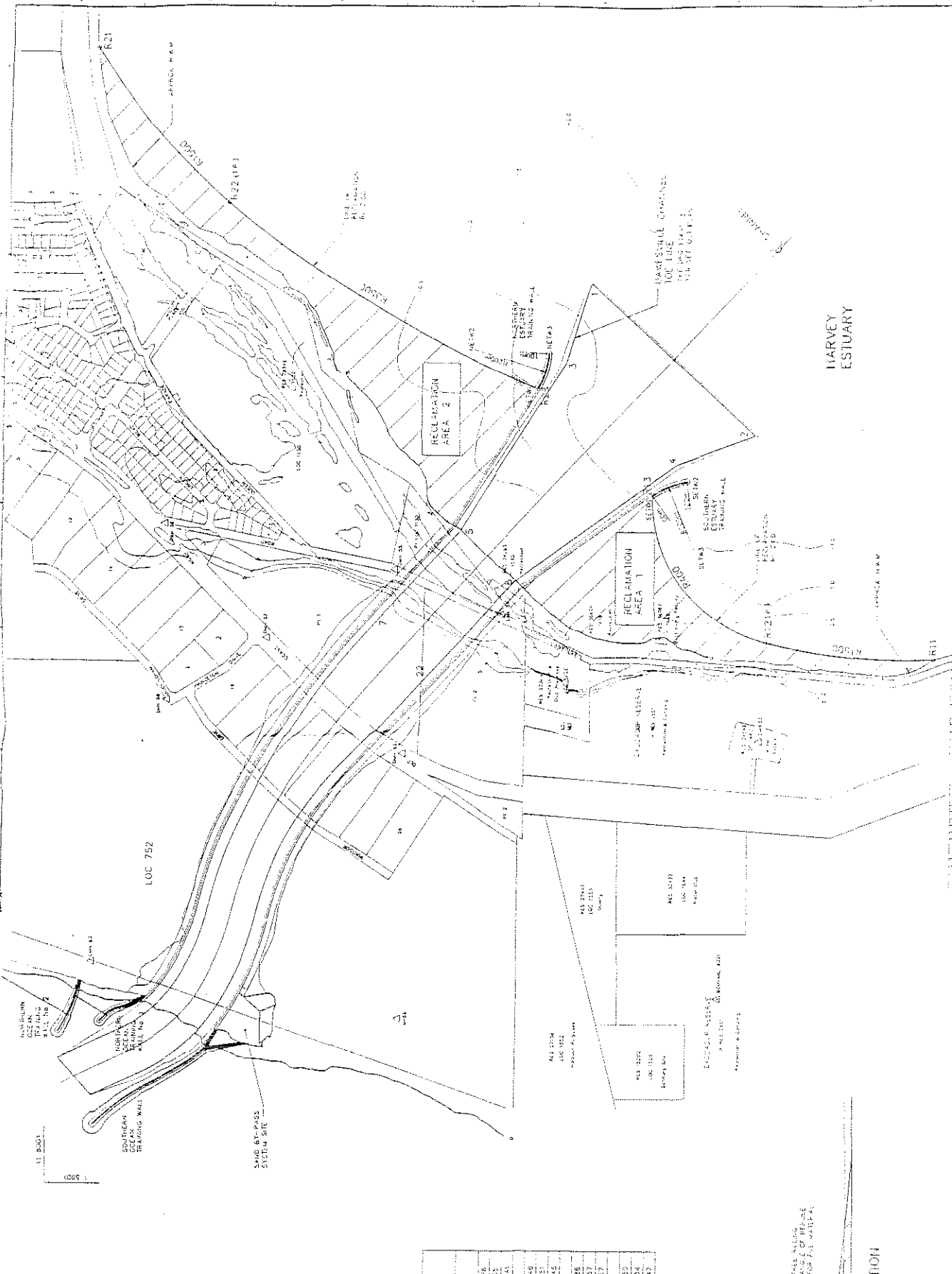
PROJECT NO.	104-3-1
DATE	1972
SCALE	1:5000
DATUM	ADAMSTON
PROJECT	PEEL/HARVEY ESTUARINE SYSTEM
DESIGNED BY	WESTERN AUSTRALIA
ENGINEER	PEEL/HARVEY ESTUARINE SYSTEM
GENERAL ARRANGEMENT PLAN	



SCALE	1:5000
DATUM	ADAMSTON
PROJECT	PEEL/HARVEY ESTUARINE SYSTEM
DESIGNED BY	WESTERN AUSTRALIA
ENGINEER	PEEL/HARVEY ESTUARINE SYSTEM
GENERAL ARRANGEMENT PLAN	

PROJECT NO.	104-3-1
DATE	1972
SCALE	1:5000
DATUM	ADAMSTON
PROJECT	PEEL/HARVEY ESTUARINE SYSTEM
DESIGNED BY	WESTERN AUSTRALIA
ENGINEER	PEEL/HARVEY ESTUARINE SYSTEM
GENERAL ARRANGEMENT PLAN	

PROJECT NO.	104-3-1
DATE	1972
SCALE	1:5000
DATUM	ADAMSTON
PROJECT	PEEL/HARVEY ESTUARINE SYSTEM
DESIGNED BY	WESTERN AUSTRALIA
ENGINEER	PEEL/HARVEY ESTUARINE SYSTEM
GENERAL ARRANGEMENT PLAN	



INDIAN OCEAN

DAVESVILLE CHANNEL

HARVEY ESTUARY

RECLAMATION AREA 1

RECLAMATION AREA 2

SAND BY-PASS SYSTEM SITE

SOUTHERN OCEAN TRAILING WALL

NORTHERN OCEAN TRAILING WALL

DAVESVILLE CHANNEL ICE TUBE

DAVESVILLE CHANNEL TRAILING WALL

SOUTHERN TRAILING WALL

RECLAMATION AREA 1

RECLAMATION AREA 2

DAVESVILLE CHANNEL

HARVEY ESTUARY

INDIAN OCEAN

CO-ORDINATES OF LEI-OUT POINTS

LOCATION	Xm	Ym
R1	2 814 727	9 454 376
R2	2 844 314	9 464 522
R3	2 873 901	9 474 668
R4	2 903 488	9 484 814
R5	2 933 075	9 494 960
R6	2 962 662	9 505 106
R7	2 992 249	9 515 252
R8	3 021 836	9 525 398
R9	3 051 423	9 535 544
R10	3 081 010	9 545 690
R11	3 110 597	9 555 836
R12	3 140 184	9 565 982
R13	3 169 771	9 576 128
R14	3 199 358	9 586 274
R15	3 228 945	9 596 420
R16	3 258 532	9 606 566
R17	3 288 119	9 616 712
R18	3 317 706	9 626 858
R19	3 347 293	9 637 004
R20	3 376 880	9 647 150
R21	3 406 467	9 657 296
R22	3 436 054	9 667 442
R23	3 465 641	9 677 588
R24	3 495 228	9 687 734
R25	3 524 815	9 697 880
R26	3 554 402	9 708 026
R27	3 583 989	9 718 172
R28	3 613 576	9 728 318
R29	3 643 163	9 738 464
R30	3 672 750	9 748 610
R31	3 702 337	9 758 756
R32	3 731 924	9 768 902
R33	3 761 511	9 779 048
R34	3 791 098	9 789 194
R35	3 820 685	9 799 340
R36	3 850 272	9 809 486
R37	3 879 859	9 819 632
R38	3 909 446	9 829 778
R39	3 939 033	9 839 924
R40	3 968 620	9 850 070
R41	3 998 207	9 860 216
R42	4 027 794	9 870 362
R43	4 057 381	9 880 508
R44	4 086 968	9 890 654
R45	4 116 555	9 900 800
R46	4 146 142	9 910 946
R47	4 175 729	9 921 092
R48	4 205 316	9 931 238
R49	4 234 903	9 941 384
R50	4 264 490	9 951 530
R51	4 294 077	9 961 676
R52	4 323 664	9 971 822
R53	4 353 251	9 981 968
R54	4 382 838	9 992 114
R55	4 412 425	10 002 260
R56	4 442 012	10 012 406
R57	4 471 599	10 022 552
R58	4 501 186	10 032 698
R59	4 530 773	10 042 844
R60	4 560 360	10 052 990
R61	4 589 947	10 063 136
R62	4 619 534	10 073 282
R63	4 649 121	10 083 428
R64	4 678 708	10 093 574
R65	4 708 295	10 103 720
R66	4 737 882	10 113 866
R67	4 767 469	10 124 012
R68	4 797 056	10 134 158
R69	4 826 643	10 144 304
R70	4 856 230	10 154 450
R71	4 885 817	10 164 596
R72	4 915 404	10 174 742
R73	4 944 991	10 184 888
R74	4 974 578	10 195 034
R75	5 004 165	10 205 180
R76	5 033 752	10 215 326
R77	5 063 339	10 225 472
R78	5 092 926	10 235 618
R79	5 122 513	10 245 764
R80	5 152 100	10 255 910
R81	5 181 687	10 266 056
R82	5 211 274	10 276 202
R83	5 240 861	10 286 348
R84	5 270 448	10 296 494
R85	5 300 035	10 306 640
R86	5 329 622	10 316 786
R87	5 359 209	10 326 932
R88	5 388 796	10 337 078
R89	5 418 383	10 347 224
R90	5 447 970	10 357 370
R91	5 477 557	10 367 516
R92	5 507 144	10 377 662
R93	5 536 731	10 387 808
R94	5 566 318	10 397 954
R95	5 595 905	10 408 100
R96	5 625 492	10 418 246
R97	5 655 079	10 428 392
R98	5 684 666	10 438 538
R99	5 714 253	10 448 684
R100	5 743 840	10 458 830

INDIAN OCEAN

DAVESVILLE CHANNEL

HARVEY ESTUARY

RECLAMATION AREA 1

RECLAMATION AREA 2

SAND BY-PASS SYSTEM SITE

SOUTHERN OCEAN TRAILING WALL

NORTHERN OCEAN TRAILING WALL

DAVESVILLE CHANNEL ICE TUBE

DAVESVILLE CHANNEL TRAILING WALL

SOUTHERN TRAILING WALL

RECLAMATION AREA 1

RECLAMATION AREA 2

DAVESVILLE CHANNEL

HARVEY ESTUARY

INDIAN OCEAN

GENERAL NOTES

1. THIS PLAN IS TO BE USED IN CONNECTION WITH THE RECLAMATION OF THE HARVEY ESTUARY AND DAVESVILLE CHANNEL.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE RECLAMATION ACT 1981 AND THE RECLAMATION REGULATIONS 1982.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE RECLAMATION ACT 1981 AND THE RECLAMATION REGULATIONS 1982.
4. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE RECLAMATION ACT 1981 AND THE RECLAMATION REGULATIONS 1982.

Appendix 3

Letter from the Department of Marine and Harbours of 6 July 1992
regarding amendments to proposed reclamation of January 1992

Your Ref:
Our Ref:
Enquiries:

DEPARTMENT OF
MARINE & HARBOURS
WESTERN AUSTRALIA



1 ESSEX ST., FREMANTLE
P.O. BOX 402 FREMANTLE, W.A. 6160
TELEPHONE (09) 335 0888
TLX: 94784 FAX: 335 0850

Director Evaluation Division
Environmental Protection Authority
38 Mounts Bay Rd
Perth W.A. 6000

ATTENTION: Ms Eve Bunbury

DAWESVILLE CHANNEL - PROPOSED ESTUARY RECLAMATION

I refer to previous correspondence and discussions regarding the proposed increase in estuary reclamation associated with the Dawesville Channel Project. As you are aware when the project was first approved in 1988 it was envisaged that approximately 10 hectares of estuary to the North and South of the Channel would be reclaimed. The reclaimed land would be largely set aside for Public Open Space however the concept plans at that time indicated a possible tourist development on a portion of the southern reclamation.

The need to reclaim additional land was recognised as far back as 1989/90 when the estuary entrance was redesigned to improve the hydrodynamic efficiency of the channel. The earlier channel design resulted in the channel excavation terminating at approximately the 1m contour. This would limit the effectiveness of the channel and could possibly lead to sedimentation problems within the channel and scouring at the entrance.

The redesigned entrance increased the length of the channel such that it now extends to at least the 2m contour and the "bell-mouth" was also increased. Plans circulated from that time incorporated the increased reclamation as did the model which has been on public display for at least the past two years. Unfortunately application for the additional reclamation was not made to the EPA at that time.

The need for estuary reclamation has always been governed by the following:

Disposal of spoil from estuary dredging operations. This material is totally unsuited for use as subdivisional fill.

The creation of adequate foreshore reserves such that public demands could be satisfied. Existing reserves in that location are limited and it is anticipated that recreational pressure will intensify following channel

acceptance or otherwise of the proposed reclamation, it may have a bearing on the contribution by Wannunup to the cost of the project.

ALTERNATIVES CONSIDERED

Limit Reclamation to 9.8 Ha as approved in 1988.

In order to achieve this the surplus spoil must be disposed of off site. This would add approximately \$3-\$4 million to the cost of the project. Spoil could not be disposed of by filling over the rubbish tip site as Mandurah Council have firmly stated that they continue using this site until they are in a position to relocate. The Department of Marine and Harbours together with other agencies is assisting Council in seeking alternative sites however a new site cannot possibly be established before the finalisation of the Dawesville Channel earthworks contract.

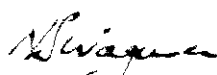
This option would also mean that there would be no net gain in foreshore reserves to the north of the channel as the government is committed to exchanging 5 Ha of land in this vicinity. This equates to the area of land approved for reclamation in 1988.

Reduction in the size of the reclamation areas would not bring a corresponding reduction in the length of the Estuary Training Walls. However the design of these would require modification which would incur a further construction cost penalty as the walls would be more substantial.

Increasing the height of fill throughout the proposed Wannunup land development would again result in cost penalties and a minimal public recreation reserve to the north of the channel. The cost penalties arise from the fact that a larger quantity of spoil must be carted over a longer distance from the east of Old Coast Road to the West.

Reducing the area of reclamation would also impact on the recreation potential of the estuary foreshore due to the extremely shallow nature of the waters in that location. The increased reclamation area ensures that the public can gain access to deeper water. The shallow waters in the vicinity will be exacerbated following channel construction as a result of the anticipated improvement in tidal fluctuations.

It is imperative that this matter be resolved as soon as possible if necessary by an on-site meeting. Any further delays may impact upon contractual obligations and delay construction.



NS SIRAGUSA
PROJECT MANAGER
DEPARTMENT OF MARINE & HARBOURS
6 July 1992

construction and the development of the surrounding land.

Disposal of surplus spoil generated from channel construction. Depending upon the final design of the land surrounding the channel it was always recognised that some of this spoil may ultimately be disposed of by way of reclamation.

The information submitted to the EPA and circulated to the public at the recent Information Day indicated that it was now necessary to increase the area of reclamation to 35 hectares. This included the area for the proposed public marina. Although the public feedback seemed to be positive, particularly when it was explained that the majority of the land so created would remain in public ownership, the EPA has expressed concerns on philosophical grounds.

In view of the EPA concerns the situation has been reassessed and it is now proposed to undertake reclamation as follows:

Revert to the 1988 approvals insofar as the southern reclamation is concerned ie 4 hectares. This land would be appropriately landscaped and set aside for recreation.

Reclaim 20 hectares to the north of the channel in accordance with the attached plan. Note this area refers only to reclaimed land and excludes water areas retained for the purposes of the public marina or proposed public beach and waterway. Of the 20 Ha reclaimed at least 15 Ha would be retained in public ownership and developed for recreational purposes. This is a substantial increase on the 5.75 Ha of existing foreshore reserves to the North of the channel.

Of the balance of existing foreshore reserve and reclaimed land to the north of the channel the Government has already agreed to exchange 5 ha with Wannunup Development Nominees in accordance with the land Exchange Agreement entered into in January 1992. Wannunup Development Nominees intend to apply to the Minister for Lands to purchase a further 5 Ha in that vicinity in order to optimise their development particularly as they have been forced to abandon plans for a waterway development to the south of the channel due to the risk of diminished water quality. Recent investigations indicate that leachates from the nearby rubbish tip may cause problems if they were to pursue that option.

Furthermore at least 5 Ha of the land acquired from the Government by Wannunup Development as part of the land exchange agreement has proved unsuited to residential development due to contamination by rubbish and the fact that some of the land extends beyond the ocean foredunes. At the time of the signing of the agreement neither party were aware that the dumping of rubbish had occurred beyond the boundary of the Quarry Reserve and onto Government owned land. Although this is not a matter which should necessarily be taken into consideration when assessing the Environmental

Appendix 4

Letter from the Department of Marine and Harbours of 31 July 1992, detailing proposed landscape plan for the reclamation area

Your Ref: 34/84
Our Ref: 323/85
Enquiries: Mr Siragusa

DEPARTMENT OF
MARINE & HARBOURS
WESTERN AUSTRALIA



1 ESSEX ST., FREMANTLE
P.O. BOX 402 FREMANTLE, W.A. 6160
TELEPHONE (09) 335 0888
TLX: 94784 FAX: 335 0850

Director
Evaluation Division
Environmental Protection Authority

ATTENTION: Ms Eve Bunbury

DAWESVILLE CHANNEL - PROPOSED ESTUARY RECLAMATION

I refer to your letters of 10 July and 27 July 1992 and to related meetings between Mr Siragusa, Ms Bunbury and Mr Colin Chalmers of the Waterways Commission concerning the proposed Estuary Reclamation.

Two alternative landscape plans have been prepared following discussion with EPA and PIMA for the proposed Estuary Reclamation as follows:

OPTION A

This option assumes that Wannunup Development Nominees is successful in obtaining approval for its proposed canal waterway development, known as Eastport, to the North East of the channel. Under these circumstances the public waterway associated with the public marina is extended northward inside the line of reclamation and is designed to link in with the Eastport Canal waterways thereby optimising circulation and water quality.

This extended public waterway incorporates a "soft" edge in order to maximise recreational potential and minimise maintenance. In addition the landscaped public open space is physically separated from the private development to the west. This extended waterway will provide the public with an opportunity to beach dinghies and utilise the adjacent picnic and recreation areas. Other than the waters adjacent the training wall and boat ramp the remainder of the estuary waters abutting the northern reclamation are extremely shallow and not suited to active recreation. The recreation potential is therefore focussed toward passive activities in this location.

The reclamation to the south is removed from boating activities and is situated in deeper water hence the landscaping is designed with a view to maximising active recreation potential.

Landscaping in both areas has been generally designed along the following principles:

Areas to be planted with trees and shrubs would be raised to provide protection for the lower grassed recreation areas and to maintain the appearance of the shoreline when viewed from the estuary. Viewing corridors allow estuary water views to be maintained from the road and marina.

Where possible and suitable the existing or "Heritage" foreshore vegetation line will be retained.

The southern reclamation comprises approximately 6 hectares and the northern reclamation approximately 19 hectares. The majority of the reclamation material consists of estuary silts and mud which is unsuited for building foundations, road base or parking areas. The natural angle of repose of this material dictates that mounding of the reclamation to minimise areas can only occur on a relatively small scale as the slopes can only be gentle. Steep slopes would inevitably be unstable and almost impossible to achieve.

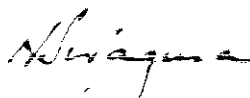
In addition to the limited capability for mounding the nature of the material also means that quality fill material must be imported from inland excavation for the carparks, roads, beaches and bunding to contain the material. This means that the 500,000 cubic metres of estuary spoil must be contained within an area of less than 20 hectares once allowance is made for imported quality fill. This equates to an average fill depth of 2.5 metres in waters which are generally less than 0.5 metres in depth. Note that the existing foreshore is generally less than RL +1.0m (AHD) in this vicinity.

OPTION B

Option B assumes that Wannunup Development Nominees is unsuccessful in obtaining development approvals for the Eastport canal development. Under this scenario the public waterway extending northward from the marina is contracted and reshaped to optimise water circulation and maintain water quality.

The reclamation areas remain unchanged however the northern reclamation does not extend as far into the Estuary when compared to Option 1. All other aspects and limitations are the same as those described for Option 1.

Matters relating to placement and containment of spoil will be addressed in detail in the Stage 3 Spoil Disposal and Management Plan to be submitted by mid September 1992.



N SIRASUSA
PROJECT MANAGER
MARINE AND HARBOURS

31 July 1992

DAWESVILLE CHANNEL
PROPOSED ESTUARY RECLAMATION

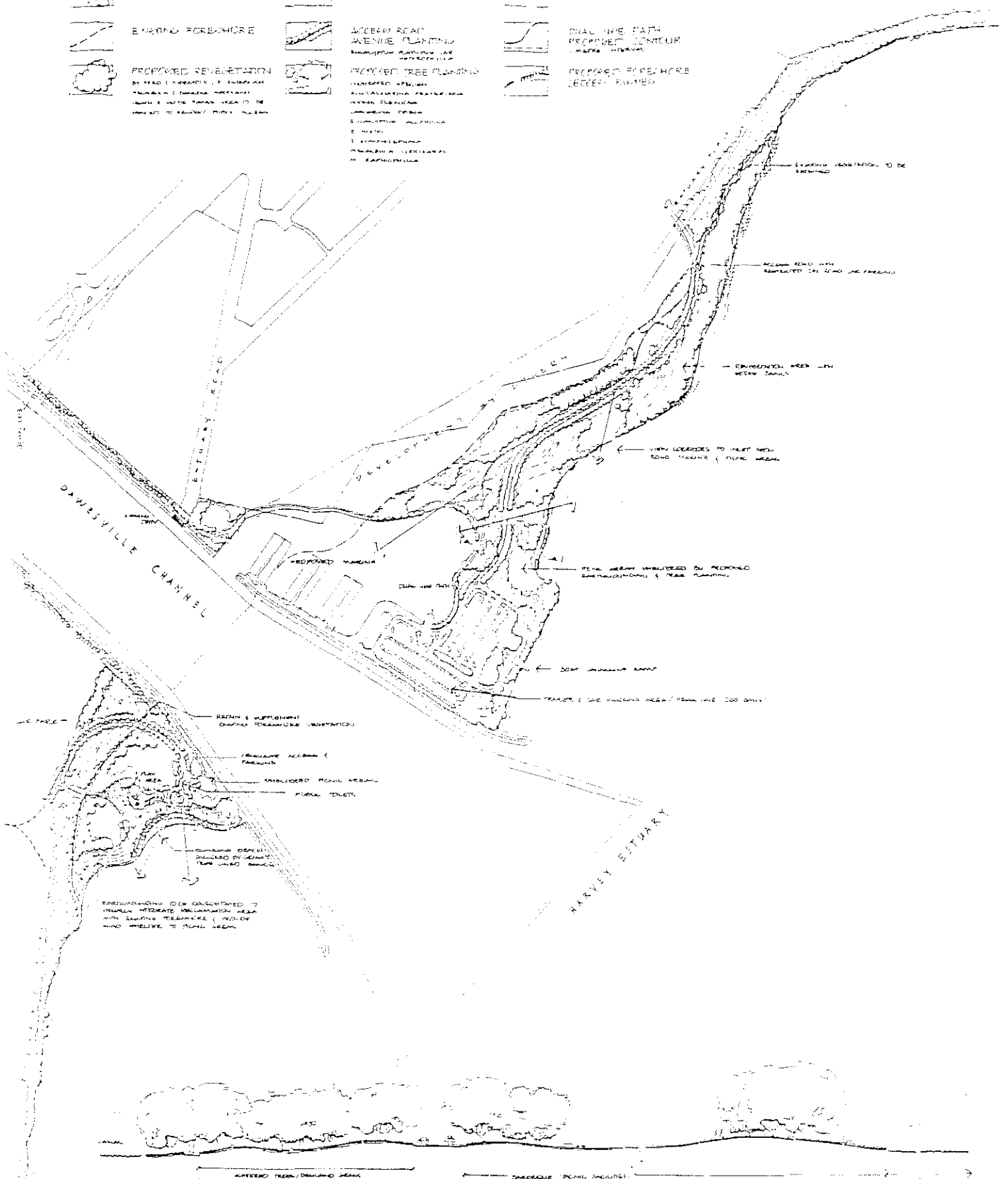
SUMMARY OF COMPONENTS

	OPTION A (Hectares)	OPTION B (Hectares)
SOUTHERN RECLAMATION -	5	5
NORTHERN RECLAMATION		
BOAT LAUNCHING/MARINA CARPARK -	5	5
OTHER RECLAIMED LAND -	15	15
WATERWAYS WITHIN NORTHERN RECLAMATION NOT FORMING PART OF THE RECLAMATION		
PUBLIC MARINA	5.5	5.5
PUBLIC RECREATIONAL WATERWAY	4.5	1.2

Contour levels of spoil within the Reclamation areas vary from 1.0m AHD to 3.0m AHD.

LEGEND

- | | | | | | |
|--|--|--|---|--|---------------------|
| | EXISTING VEGETATION TO BE RETAINED | | DRYLAND LAWN | | VIEW CORRIDOR |
| | EXISTING FOREGROUND | | ACCESS ROAD | | DUAL LINE PATH |
| | PROPOSED REVEGETATION BY TREE PLANTING (EUCALYPTUS, GUMBAK, PINE, AND OTHER TREES AS TO BE DETERMINED BY THE DESIGNER) | | AVENUE ROAD AVENUE PLANTING (EUCALYPTUS, GUMBAK, PINE, AND OTHER TREES AS TO BE DETERMINED BY THE DESIGNER) | | PROPOSED CONTOUR |
| | | | PROPOSED TREE PLANTING (EUCALYPTUS, GUMBAK, PINE, AND OTHER TREES AS TO BE DETERMINED BY THE DESIGNER) | | PROPOSED FOREGROUND |



SECTION I
SCALE: 1:500

DAWESVILLE CHANNEL

PRELIMINARY LANDSCAPE CONCEPT FOR PUBLIC OPEN SPACE OPTION B

DEPARTMENT OF MARINE AND HARBOURS

LANDSCAPE ARCHITECT
Dawesville Channel



LEGEND



EXISTING VEGETATION TO BE RETAINED



EXISTING FORESHORE



PROPOSED REVEGETATION BY ROAD (ROSEBANK, 20 SPECIES)
 PALMUM (SUNSHINE MOPAN)
 QUERCUS (WATTLE)
 AREA TO BE PLANTED TO REPAIR ROAD MARGIN



DRYLAND GRASS



ACCESS ROAD AVENUE PLANTING
 EUCALYPTUS SP. (EUCALYPTUS)
 GONOLYPTUS SP.



PROPOSED TREE PLANTING
 MANGROVE SPECIES
 ALLOCASWALLERIA FRATERNA
 MIMOSA TILLYARDII
 GONOLYPTUS SP.
 EUCALYPTUS SP.
 E. SP. (EUCALYPTUS)
 E. SP. (EUCALYPTUS)
 M. SP. (MIMOSA)
 M. SP. (MIMOSA)



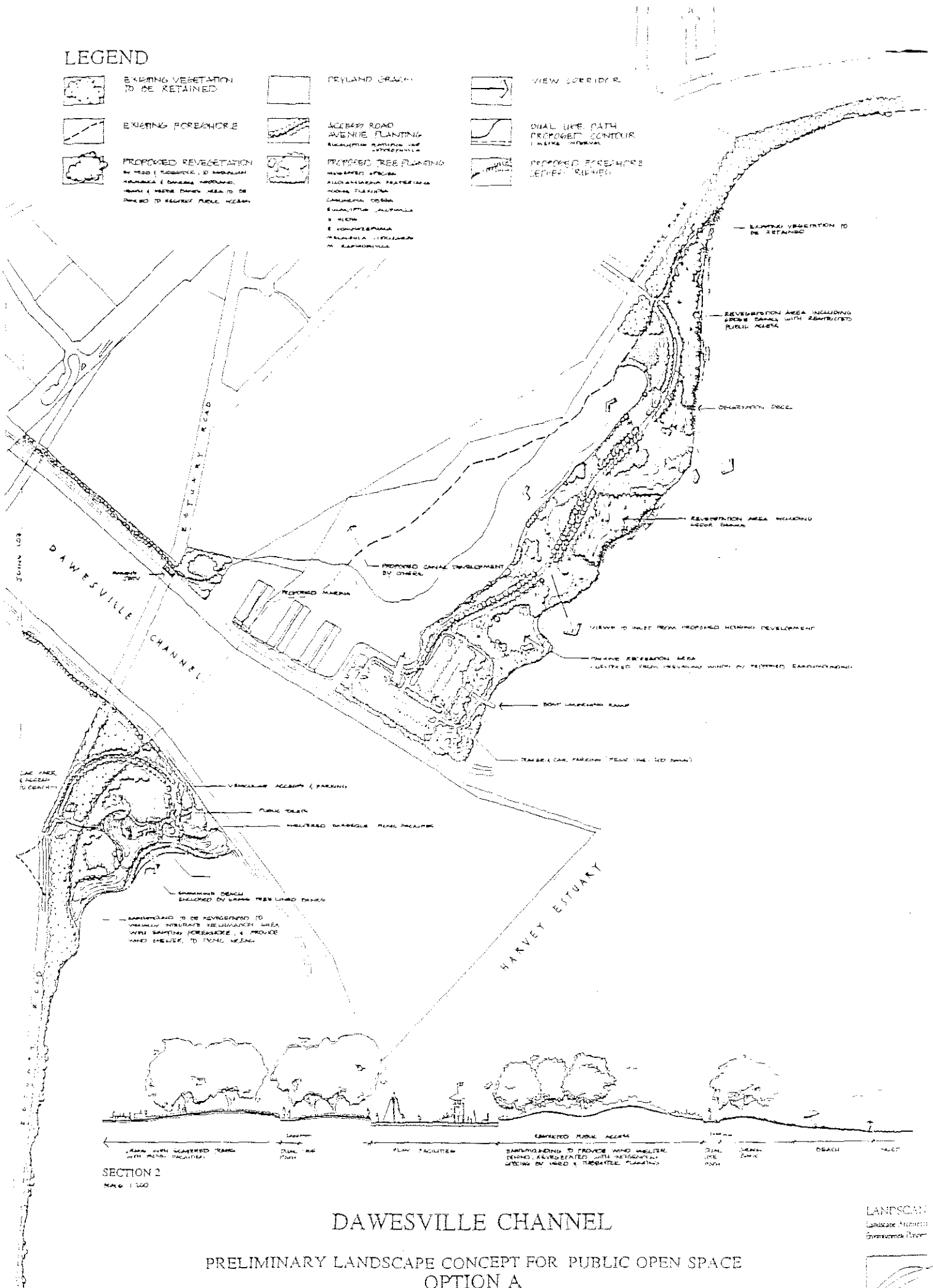
VIEW CORRIDOR



DUAL BIKE PATH
 PROPOSED CONTOUR
 1.5M SPACING



PROPOSED FORESHORE
 DEFINED RIPRAP



DAWESVILLE CHANNEL

PRELIMINARY LANDSCAPE CONCEPT FOR PUBLIC OPEN SPACE OPTION A

DEPARTMENT OF MARINE AND HARBOURS

LANDSCAPE
 Landscape Architects
 Environmental Planners

