Responses to the submissions tabled at the meeting held on 5 October 1998

HKUST

We note the generally positive comments.

2. With regard to the various qualifications expressed we would respond as follows:

Comment	Response
Dispersion at the outfall - have sufficient checks been carried out to satisfy that the DHI model predictions for dispersion at the outfall diffusers are really occurring?	The model used for assessing dispersion at the diffusers is not a DHI model but a near-field dilution model called JETLAG which has been developed by a local expert under local conditions. It is well established and gives reliable results. As the diffusers have not yet been built we cannot yet check whether the predicted dilutions "are really occurring". The far-field dispersion model is a DHI model. The consultants have taken thousands of field measurements for the purposes of calibration and verification. We have every confidence in the model accuracy.
How quickly will the high levels of pollutants be diminished to acceptable levels?	The levels of toxic contaminants in the sewage are relatively low, not high. At the edge of the initial dilution zone, they will all be reduced to levels at which they are not known to be harmful; this is an area along the length of the diffusers which is 2 km long and usually less than 100 m wide.
Concerns over the method of disinfection.	We note and fully understand the concern over the possible impacts of choosing chlorination as a method of disinfection. This will be addressed in the second phase of the study. Our initial preference is to use ultraviolet light, although this

	will be considerably more expensive than chlorination.
Concerns over assessment of the impacts of sludge disposal.	Assessment of the costs and operational impacts of sludge disposal are included in the consultants' brief; costs have been incorporated in the comparison of options; the operational impacts will be addressed in Phase II.
Concerns that worst case scenarios have not been covered.	It is correct that the data presented in the briefing document are time-averaged. This is because the criteria that were agreed upon at a very early stage were generally time-averaged criteria. However this does not mean worst case effects have been ignored. For toxic contaminants, the models predict that even under the worst case of initial dilution the relevant criteria will be met at the edge of the initial dilution zone. For dissolved oxygen, which is also a concern, the models predict that even under the worst conditions the level will not go below 2.8 mg/L.
Regional considerations and Pearl River Estuary Studies.	We entirely agree that regional considerations are of great importance. We hope to pursue regional initiatives through the Hong Kong - Guangdong Environmental Protection Liaison Group and other channels. We would caution though, that the nutrient loads that come down the Pearl River do not just come from sewage, but also from the application of fertiliser to the land. The latter source is likely very important and any decisions about catchment management and allocation of resources need to take it into account. Hopefully HKUST's Pearl River Estuary Pollution Project will help plug this information gap.

The Conservancy Association

The Association's submission can be broadly divided into two parts: the first part makes the case for pursuing Biological Nutrient Removal (BNR). We do not wish to comment on the Association's preference but we would like to make the following points:

(i) no matter which option is selected the mainland WQO for Total Inorganic Nitrogen in the vicinity of the outfall will continue to be complied with;

(ii) it is correct that the WQO for TIN in southern Hong Kong waters of 0.1 mg/L will not be complied with, but the extent to which the TIN level will be raised in southern Hong Kong waters will be only 0.01 to 0.03 mg/L over a relatively small area; it is doubtful that this is ecologically meaningful;

(iii) it is true that there appears to be a trend of increasing nutrients in southern Hong Kong waters; however we should not jump to the conclusion that this is solely due to pollution by sewage; it is likely that run-off of fertiliser from the land in the Pearl River catchment makes a significant contribution also; dealing with this will require a completely different approach and extensive liaison with Guangdong authorities;

(iv) bearing in mind (i) to (iii) above, the community needs to consider whether the investment in BNR would be worthwhile, given that it would unlikely result in an ecologically meaningful change in water quality conditions, and may not even address the primary cause of excessive nutrients in the Pearl River estuary area.

2. The second part of the submission works from the position that only BNR is acceptable and then suggest that this level of treatment would best be provided by a semi-distributed system. Our comments are:

(i) because of the restricted dispersion characteristics of Victoria Harbour, any proposal for a system of distributed discharges in the harbour will necessarily entail a level of treatment equivalent to BNR; this means additional sites will have to be found for large STWs, the cost and land

implications of which have already been set out in our paper to the EA panel;

(ii) it is suggested that there may be new treatment systems on the market which would allow BNR to be delivered in less space and at less cost; some 50 possible treatment systems were considered under the SSDS Options Review in 1994/95, including the SBR process mentioned by the Association; none of the technologies could deliver BNR with significant space savings (apart from those achieved by adopting deeper aeration tanks and double layer sedimentation tanks, which have already been assumed in the SSDS EIA study) and costs were comparable to, or higher than, conventional BNR systems; we have no knowledge of any new advances which have changed that position; it may be that advances are being made on a pilot or research scale but we could not risk adopting such technologies for a scheme as large as SSDS, nor can Victoria Harbour afford to wait while such technologies undergo further development;

(iii) it is suggested that we have adopted inflated land values in providing our estimates of the cost of a distributed system; this is fundamentally untrue; we have not valued the land at commercial prices, we have only estimated the cost of forming new land through reclamation, which would undoubtedly be needed if a semi-distributed system were to be pursued; these costs would be the same whatever the uses proposed;

(iv) it is suggested that we should learn from practice in Japan and develop compact, covered STWs to reduce land-take and avoid the “NIMBY” syndrome; the land requirements identified in paper 3 considered at EA panel on 5 October already assume compact designs; we are also assuming that we will need to cover any new STWs; nevertheless the land requirements are still large and no matter what efforts we make we suspect the NIMBY syndrome will continue to have a powerful effect when trying to locate STWs;

(v) it is suggested that adopting a semi-distributed system would avoid anticipated cost over-runs and delays due to the use of deep tunnels; however it is clear from comments under the heading “Technological changes” that the Association favour a separate treatment works at Green

Island or under Mount Davis; both of these options would still necessitate the use of deep tunnels because there would still be a need to transfer the sewage to Green Island or Mount Davis, so the (perceived) problem would still exist; furthermore the timing of the Green Island reclamation is too uncertain for us to rely on it to provide a speedy means of dealing with Hong Kong's sewage problem, and the Mount Davis site (which would necessitate the construction of a very expensive cavern) is too small to accommodate a BNR works of the necessary size.

Friends of Earth

FoE's submission contains many misgivings about the study. In setting out our comments, we have focussed on those aspects which require clarifications.

Comment	Response
Introduction	
"the sustainability of the scheme is questionable"	We do not understand the comment, and there is no evidence to substantiate it. The criteria established for acceptability of the options are set so as to ensure marine life can be sustained. Since all the identified options meet these criteria it follows that the proposals are environmentally sustainable.
Discontinuity of the Design Concept from Stage I to Stage II	
"the briefing document has clearly pointed out that the quality and quantity of the disposed sewage is far beyond the limits of assimilative power of the sea."	This is untrue. The briefing document does nothing of the sort. The SSDS EIA has taken chemically enhanced primary treatment (CEPT) as the minimum treatment level following the recommendation of an independent panel of experts. The EIA has demonstrated clearly that use of CEPT would allow all but one of the water quality objectives, total inorganic nitrogen (TIN) to be met. The TIN exceedence occurs because of the relatively high background level. The extent of exceedence is small and unlikely to be ecologically meaningful.
"The background nitrogen level contributed by the Pearl River is so high and the dissolved oxygen in the Lema Channel is so low in wet season that lead to the non-compliance of water quality objectives (WQOs) with CEPT effluent discharge."	This is inaccurate and misleading. The total inorganic nitrogen (TIN) levels are indeed elevated as a result of outflows from the Pearl River, but not enormously so. Indeed the TIN WQO in mainland waters will be met in the vicinity of the outfall no matter what level of treatment is provided. The TIN WQO in southern Hong Kong waters will not be met but that is primarily because it is a very stringent requirement that is not met now. In both cases the changes brought about by a CEPT discharge would not be great and would be unlikely to have any ecological meaning. Although the DO level in the Lema Channel in the summer is low (around 4 mg/L) compared with the Mainland WQO (6 mg/L), the effect of the SSDS discharge is minimal, it

	would only reduce the DO in the receiving waters by 0.2 mg/L (~5%). In fact, the DO level in the Lema Channel meets the WQO on an annual basis.
"The background mercury level of southern waters has already exceeded the WQO."	Hong Kong has no WQO for mercury. The mainland Chinese standard is 0.05 μg/L, which is probably one of the most stringent in the world. It is only one tenth of Japan's. As far as we can establish, it is exceeded at a wide range of coastal locations in Guangdong. The SSDS discharge will raise the mercury level by only 1.5% in a very limited area. This is unlikely to be ecologically meaningful.
"The findings clearly indicated that disinfection and higher treatment levels such as biological treatment or biological nutrient removal were necessary"	The study has demonstrated that disinfection is necessary. Biological treatment is not required unless one wishes to reduce the decrease of DO in the receiving waters by 0.1 mg/L and avoid any rise at all in nutrient levels, even though they would have no ecological effects.
<u>Ecotoxicological assessment</u> "the assessment has not taken into account "worst case" conditions. If the sewage discharge will result in period of only one to five hours in which oxygen drops significantly below the "average" conditions described in the model this may be sufficient to eliminate a sensitive species. An example of this occurred in Mirs Bay in 1994 when water with too little oxygen entered the bay for a short period of time killing most of the corals there."	The worst case conditions are experienced in the initial dilution zone in an area within 100m of the outfall diffusers. A combination of modelling and ecotoxicological assessment shows that even under "worst case" tidal conditions with the lowest anticipated dilutions there will be no toxicity at the edge of the dilution zone. As regards dissolved oxygen, model predictions are that at no time, under any tidal condition in any season, will the level outside the initial dilution zone fall below 2.8 mg/L. This should provide sufficient protection for even the most sensitive species. The reference to the deoxygenation event in Mirs Bay is misleading. The event (a very rare natural one) lasted for several days, not a few hours, and oxygen levels dropped well below those predicted in the SSDS EIA work. The scale of this event could never be reproduced by a discharge of treated sewage.

Red tides

"Population growth and the recurrence of red tides have not been fully addressed in this study."	This statement is fundamentally untrue. The projected pollution loads were based on the very latest projected population for the year 2016 which takes into account the latest growth trends. The possibility of increased red tides is catered for in the projections for changes in nutrient levels. Biological nutrient removal is one of the options put forward. Whether it is selected will depend on what weight the community gives to the precautionary approach.
"It is tempting to suggest that the public could vote for a disposal and treatment option for Stage II with built in flexibility to raise the standard of treatment and future expansion allowance. FoE would like to caution against a repeat of the Stage I fait d'accompli which proposed a centralised system limiting alternative distributed treatment system possibilities."	We do not understand this statement. It seems to be implying firstly that there will be no possibility of a future upgrading to the system and secondly that a distributed system would be better. There is absolutely no reason why a further upgrading of treatment should not take place in the future if found necessary. A distributed system would be extremely expensive and would necessitate further reclamation in the harbour, which the community clearly does not want to see, but which would deliver no obvious environmental benefits over a centralised system.

Geotechnics

"The geology of the Lema Channel is not well known that is the critical factor for the workability of the deep tunnel."	Only one option involves a tunnel in the Lema Channel. The geological conditions may be a factor in making the final selection.
"If only one outfall is proposed for discharging all the sewage of SSDS, any delay or failure of the tunnel drilling will jeopardise the whole system."	There is no reason why the tunnels should not be properly constructed. In any event, any delays would not cause anything like the problems for Victoria Harbour that would be caused by pursuing a distributed treatment system involving reclamations, as this would mean much longer delays while more EIAs are done for reclamations, and land is formed.

Modelling

"The document provides no information regarding the development and verification for the accuracy and preciseness of the modelling."	This is a very complex and highly technical area of work which cannot be easily presented in a briefing document. We have used one of the best modelling houses in the world. A detailed report on model calibration and verification is being compiled and will be available for public inspection from 24.10.98.

Waste management

These paragraphs claim that the EIA has not addressed the impacts of sludge disposal and suggest recycling of sludge should be considered.	With the majority of sewage in Hong Kong being treated properly the quantities of sludge being disposed of will increase enormously, no matter which option is chosen. A separate study has therefore been commissioned to review sludge management policy. It is likely the study will recommend incineration. Reuse as soil conditioner is really not feasible because of the high saline content of Hong Kong sewage. Furthermore it is extremely unlikely that any market could be found. Hong Kong currently produces about 70 tonnes of livestock waste each day but outlets can be found for only about 12 tonnes of composted wastes. The projected sludge arisings in the future will be around 2000 tonnes per day.

WWF HK

We are pleased to note that "WWF HK is very pleased to know that Government has planned to clean the harbour by means of the Strategic Sewage Disposal Scheme (SSDS) which aims to collect all the sewage produced to one point and have a centralised treatment system before discharging to the sea". We have no specific comments on the preference expressed (i.e. higher treatment level such as secondary level plus disinfection).

The University of Hong Kong

We find Prof. Lee's submission a balanced assessment of the position in Hong Kong. We are also pleased to note the positive comments that "the approach adopted in the Phase 1 of the EIA Study is acceptable", that "The scheme has built in flexibility ...", and that "the EIA Study applied the best possible methodology and provided a list of viable options for further considerations". We cannot agree more with the views that "the "Do Nothing" approach is not an option" and that "If an option is not decided after rational debate, the water quality in our harbour will deteriorate, and Hong Kong's environment will suffer".

The Hong Kong Marine Conservation Society

We note that the Society considers all the options to be essentially acceptable, and urges for the most cost-effective option. We have no specific comments on the preference expressed (i.e. CEPT + disinfection with S E Lamma outfall).

2. We are pleased to note that the Society is willing to record its view that "Both EPD and the consultants are congratulated for the objective and comprehensive data provided with practical solution suggested to solve our sewage problem."

Letter from the Hon CHOY So-yuk and NG Ching-fai

We have already replied separately to the two Hon Members on 15 October 1998, vide the attached.

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The Government of the Hong Kong Special Administrative Region

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15 October, 1998

(By Fax 2971 0197)

Prof Hon Ng Ching-fai
Member of the LegCo Panel on
Environmental Affairs

Dear Professor Ng,

I refer to your letter of 30.9.98 to the Chairman of the Legislative Council Environmental Affairs Panel, which was tabled at the meeting held on 5 October. I am sorry that you were not able to be present at that meeting.

I do hope that you have had time to look at the papers which we prepared for that meeting, and the letter we sent to the Panel of 29 September.

As that letter said, the EIA study on the SSDS Stage II is being carried out in full compliance with the Environmental Impact Assessment Ordinance. Indeed, we are exceeding the requirements of the Ordinance by taking time out in the middle of the study to brief the Legislative Council, interested parties, and the community about how the study is developing. I entirely share your view that this is a programme with enduring implications for Hong Kong, and needs to be understood and supported by the community.

This understanding and support can only be developed through public information and discussion. This is the reason for putting out the information on the study now, rather than waiting until completion of the study, by which time the administration would have had to have taken decisions about the treatment level and outfall location without you or the community being aware of what the choices are.

May I assure you again that the process of discussion on our sewage treatment system is not confined to Hong Kong. As we have set out clearly in our letter of 29 September, the Expert Group between Hong Kong and the Mainland to discuss the development is an official group, chaired on the Mainland side by the Director of the Economic Affairs Department of the Hong Kong Macau Affairs Office, and including the Director of the Pollution Control Department of the National Environmental Protection Agency, the director of the General Management Department of the State Bureau of Oceanography and the Deputy Secretary General of the Guangdong Provincial People's Government. The Technical Group, officially established under the Expert Group includes members of the Guangdong Environmental Protection Bureau and a Deputy Secretary of the Zhuhai Government.

I am grateful to you for drawing attention to concerns in Zhuhai and Guangdong. We arranged a special briefing session in Zhuhai on 14 October and will continue to keep in close contact with the authorities there. Much of the data that we have collected in the course of the study will be of use to them, and we wish to make clear that we share their concern that nothing we do will add to regional problems.

It is clear from the discussions that I have had with you, the EA panel and many others that a lot of concern has been caused by our constant talk about the "sewage disposal" scheme, with the implication that we are just trying to get rid of the sewage, rather than handling and treating it in an environmentally responsible way. I very much regret that and would welcome your support and assistance in correcting this error.

The points I would like to get across are these:

- Hong Kong is simply disposing of its sewage at the moment, dumping 440 million cubic metres of virtually raw sewage into the harbour each year. This is very bad for us and not good for our neighbours

- Our objective is the proper treatment of all our sewage, so that the treated water can be released into the marine environment without causing damage either to Hong Kong or to our neighbours

- It makes sense to start putting in that treatment system (which can be upgraded later if required) as quickly as we can so as to end the severe degradation of HK waters and the economic losses we are suffering, as well as reducing any impact we may be having on regional water quality.

(Kim Salkeld)
for Secretary
for Planning, Environment and Lands

c.c. Hon Christine Loh - Chairman of the LegCo Panel on
Environmental Affairs
(Fax No. : 2575 8430)

similar letter to Hon Choy So-yuk