PWP Item 331DS
Outlying Islands Sewerage Stage 2 – South Lantau Sewerage Works

PROJECT PROFILE

The Government of the Hong Kong Special Administrative Region
Drainage Services Department

July 2009

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Drawing No.	Drawing Title
DCM/2009/006	331DS – Outlying Islands Sewerage Stage 2, – South Lantau Sewerage, General Layout Plan

1. BASIC INFORMATION

1.1 Project Title

The title of this Project is:

"Outlying Islands Sewerage Stage 2 – South Lantau Sewerage Works" hereinafter referred to as the "Project"

1.2 Purpose and Nature of the Project

This Project is to provide sewerage system, including trunk and village sewerage, sewage pumping stations, a sewage treatment works (STW) and associated submarine outfall for proper collection, treatment and disposal of the sewage arising from South Lantau, including areas in Shui Hau, Tong Fuk, Cheung Sha, San Shek Wan, Pui O and Ham Tin. The key elements of the Project are:

a) provision of village sewerage to unsewered areas of Shui Hau, Tong Fuk, Cheung Sha, San Shek Wan, Pui O and Ham Tin in South Lantau. The works involves construction of about 15km of gravity sewers of 150mm to 375mm diameter; and three village sewerage pumping stations with the capacity of less than 2000m^3/day (Average Dry Weather Flow (ADWF)) and associated rising mains (a total length of about 200m with 150mm diameter) in Pui O and Cheung Sha areas;

b) construction of about 3km long trunk sewer of 225mm to 450mm diameter, six sewage pumping stations with the capacity of less than 2000m^3/day (ADWF) and the associated rising mains (a total length of about 13km ranging from 150mm to 250mm in diameter) along South Lantau Road for collection and conveyance of sewage from unsewered areas mentioned in item a) above to the proposed San Shek Wan STW; and

c) construction of a STW at San Shek Wan, associated effluent pumping station and a submarine outfall of about 800m in length and about 300mm in diameter. The treatment capacity of the proposed San Shek Wan STW and associated effluent pumping station is about 3,500 m^3/day (ADWF).

1.3 Name of the Project Proponent

Consultants Management Division, Drainage Services Department (DSD)

1.4 Location of the Project

The proposed sewerage works is located at South Lantau. The extent of the sewerage works is indicated on General Layout Plan No. **DCM/2009/006**.

1.5 Types of Designated Project Involved

Based on the definition as listed in Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), the following work items are classified as designated projects:

• A dredging operation which is less than 500m from the nearest boundary of an existing coastal protection area under Part 1, C12;

• A sewage pumping station with an installed capacity of more than 2,000m^3 per day and a boundary of which is less than 150m from an existing resident area under Part 1, F3; and

• A submarine sewage outfall under Part 1, F6.

1.6 Name and Telephone Number of Contact Persons

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2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Implementation

EIA will be carried out by consultants. Detailed design and construction supervision / contract administration will be carried out by either consultants or in-house staff of DSD. Construction is tentatively scheduled to commence in late 2013 for completion in late 2017.

2.2 Interactions with Other Projects

Water Supplies Department (WSD) has proposed a project for replacement and rehabilitation of water mains in South Lantau. According to the latest tentative programme, WSD has scheduled to commence the works in July 2010 for completion in October 2014. Under the preliminary review, the interface can be resolved by entrustment or staging of proposed water main replacement and rehabilitation works to be completed prior to the commencement of the sewerage project (or vice versa). Hence, it is envisaged that there will not be any significant interactions with WSD's work.

3. POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 Outline Process Involved

3.1.1 Overview of the Project

The Project will provide sewerage system, including trunk and village sewerage, sewage pumping stations, a STW and associated submarine outfall for proper collection, treatment and disposal of the sewage arising from South Lantau, including areas in Shui Hau, Tong Fuk, Cheung Sha, San Shek Wan, Pui O and Ham Tin.

The village sewerage system will mostly operate by gravity except at several local low-lying areas, where three sewage pumping stations and associated rising mains will be provided to overcome the topography constraints.

The trunk sewerage consists of trunk sewers, six sewage pumping stations and rising mains to collect sewerage from the villages along the South Lantau Road and to convey the sewage to the proposed STW at San Shek Wan for treatment.

The preliminary design of San Shek Wan STW incorporates the inlet pumping chamber, inlet coarse and fine screens, grit removal facilities, bioreactor, sludge digester, sludge holding tanks and dewatering units. Regarding disinfection facility, if required, UV disinfection would be proposed. The treated effluent will be discharged to sea through the proposed effluent pumping station and submarine outfall. The dewatered sludge will be disposed of at landfill.

Major construction activities will include earthworks (excavation and backfilling works), piling, pipe jacking, pipe laying, dredging, disposal of excavated/dredged materials; building construction; and installation of electrical and mechanical plant and equipment.

3.1.2 Site Plan and Existing Process

The general layout plan of the Project is shown on Drawing No. **DCM/2009/006**.

The area covered by the Project is generally unsewered except at the existing correctional institutions and a number of hostels where local sewerage and treatment plants are operating. The existing houses are generally equipped with septic tanks or other private sewage treatment facilities which require regular maintenance by the residents. Failure of proper maintenance unavoidably affects the water quality of the rivers and receiving water body in the nearby area.

3.2 Possible Environmental Impacts During Construction of the Project

The objective of this section is to highlight the likely environmental impacts and issues that may arise during the construction of the Project.

3.2.1 Dust

Dust may be generated from some construction activities, mainly earthworks.

3.2.2 Odour

During construction, sludge in the existing septic tanks may be trucked off-site before demolition of the tanks. Odour may be generated during the trucking of sludge.

3.2.3 Noise

The construction activities may generate some noise through the use of conventional construction plants and equipment, like piling equipment, air compressors and excavators.

3.2.4 Liquid Effluents, Discharges or Contaminated Runoff

Contaminated site surface runoff may be generated as a result of the construction activities, for example due to erosion of excavations, oils or chemicals used, etc. Dredging works for laying of the submarine outfall may have impacts on the marine environment. Dredging of seabed may release sediments, hence increasing suspended solids concentrations. Contaminants originally trapped in the sediments, if any, may also be released into the water column during the dredging process.

3.2.5 Generation of Waste

Construction activities will generate various types of waste, such as timber from formwork and falsework, and waste concrete from on-site concreting. The workforce on site will also generate general refuses comprising food scraps, paper and empty containers, etc.

3.2.6 Unsightly Visual Appearance

There may be a loss of vegetations and trees at the proposed STW and pumping station sites and their surrounding areas during the construction. Visual impacts resulted from the construction activities will be temporary. The presence of construction equipment and stockpiled materials on works site may be a source of visual impacts to nearby sensitive receivers.

3.2.7 Ecological Impacts

Construction works, including the dredging activities may have impacts on the ecologies at:

- Lantau South Country Park, Green Belt, Coastal Protection Area;
- Dolphins and porpoises in South Lantau waters;
- Horseshoe crab habitat at Shui Hau and ;
- Ecologically important streams at Tong Fuk and Pui O.

3.2.8 Traffic Impacts

Construction materials for the Project will need to be delivered to the site and the temporary storage areas. Spoil and waste materials will need to be removed via the South Lantau Road. Temporary closure of one lane may be required during trunk sewers construction.

3.2.9 Fisheries Impacts

Construction of the submarine outfall will require marine works. This may result in some extent of fishing ground loss during the construction stage.

3.3 Possible Environmental Impacts During Operation of the Project

The objective of this section is to highlight the likely environmental impacts and issues that may arise during the operation of the Project.

3.3.1 Odour

The potential odour sources are the STW and sewage pumping stations.

3.3.2 Noise

The sewage/sludge pumps, blowers and the ventilation fans of ventilation systems are potential noise sources during operation of the STW and sewage pumping stations.

3.3.3 Liquid Effluent Discharges

Effluent from the proposed STW (instead of the discharge from septic tanks) will be discharged into the sea at South Lantau. The long-term water quality of the Project area will be improved after the Project is commissioned.

3.3.4 Generation of Waste

Screenings, grit and sludge will be generated due to the sewage flow to be handled by the STW and sewage pumping stations.

3.3.5 Storage, Use, Handling, Transport or Disposal of Hazardous Materials

Potential hazardous materials, such as lubricant oil and chemicals, may be used in the STW. The chemicals referred to are polymers, which will be used to make-up polymer solutions as aids in sludge dewatering.

3.3.6 Risk of Accidents Resulting in Pollution

The risks of accidents that may result in discharge of untreated or partially treated sewage include:-

a) Failure of power supply;
b) Equipment breakdown; and
c) Pipeline leakage.

Accidental damage to the submarine outfall may result in discharge of treated sewage at non-designated location.

3.3.7 Unsightly Visual Appearance

The above ground structures at the STW and sewage pumping stations may induce visual impacts.

3.3.8 Fisheries Impacts

Submarine outfall will form permanent pipeline below existing seabed. This may result in some extent of fishing ground loss during the operation stage.

4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

The purpose of this section is to outline those existing and planned sensitive receivers and sensitive parts of the natural environment which might be affected by the Project.

4.1 Existing and Planned Sensitive Receivers and Sensitive Parts of the Natural Environment

4.1.1 Residential Developments

The major residential developments in the Project area include:-

Tong Fuk	Tong Fuk Centre, Queen's Court, Prince's Court, Water Garden and village houses in the nearby areas;
Cheung Sha	Cheung Sha Villa, Miami Garden, Leyburn Villas, Butterfly Crest, Bahama Garden, Cheung Fu Villas, Cheung Sha Sheung Tsuen, Cheung Sha Ha Tsuen; and
Pui O	Village houses in San Shek Wan, Lo Uk Tsuen, Pui O San Wai Tsuen, Pui O Lo Wai Tsuen and Ham Tin Tsuen.

4.1.2 Educational Institutions

The educational institutions in the Project area include:-

Tong Fuk	Lantau International School (primary school); and
Pui O	Bui O Publc School (primary school).

4.1.3 Recreational Facilities

South Lantau Coast is a well-known popular destination to local visitors. A considerable numbers of them are attracted to South Lantau for its wide range of recreational activities, such as countryside outing, hiking, BBQ, camping and water sports. One medium size hostel in San Shek Wan is in operation. In addition to the choice of public camp site in Pui O beach, many visitors stay in holiday accommodations in Shui Hau, Tong Fuk, Pui O and Ham Tin in weekends and public holidays. In Cheung Sha, some executive holiday houses are provided for company staff to spend their holidays in South Lantau.

4.1.4 Water Courses, Nullahs and Confined Water Bodies

Water courses and water bodies in the vicinity include the following:

- Tong Fuk River;
- Pui O River;
- Shui Hau Wan;
- Tong Fuk Miu Wan; and
- Pui O Wan.

4.1.5 Beaches

The gazetted beaches near the Project areas are Pui O, Cheung Sha and Tong Fuk.

4.1.6 Marine Water Resources

The Cheung Sha Wan Fish Culture Zone is located near the Project area.

4.1.7 Areas of Conservation Value

The Project area is surrounded by Lantau South Country Park and the existing southern coastlines. It has extensive densely vegetated hill slopes with relatively small areas of flat lands along the foothills where low-density residential developments locate. The village sewerage works will fall within “Village” and “Green Belt” zones. As regards the sites for the proposed San Shek Wan STW and associated effluent pumping stations, they will fall within “Coastal Protection Area” zone. Currently, the STW site is mainly being used as an open storage compound by a utility undertaking.

4.1.8 Cultural Heritage

The review of the survey maps and initial site inspection have identified the following known archaeological sites and built heritage in the vicinity of the tentative sewer alignments, the sewage pumping stations and STW:

Archaeological Sites :	Pui O Archaeological Site
	Cheung Sha Ha Tsuen Archaeological Site
	Tong Fuk Archaeological Site
	Tong Fuk Miu Wan Archaeological Site
Built Heritage :	Shui Hau Tsuen, Tong Fuk
	Cheung Sha Ha Tsuen
	Cheung Sha Sheung Tsuen
	Pui O Lo Wai Tsuen
	Pui O San Wan Tsuen
	San Shek Wan
	Ham Tin

4.2 Major Elements of the Surrounding Environment Affecting the Project

It is envisaged that no major elements of the surrounding environment is likely to affect the proposed works.

5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND FURTHER ENVIRONMENTAL IMPLICATIONS

This section describes those measures likely to be incorporated in the design to minimise environmental impacts arising from both the construction and the operation phases of the Project.

5.1 Construction Stage

5.1.1 Dust

The contractor will be required to follow the good construction practices for dust minimisation to reduce dust nuisance to a minimum. A number of practical measures include regular water spraying, provision of vehicle wheel-washing and body washing facilities and shielding of stockpiled materials. Relevant clauses will be incorporated into the contract documents.

5.1.2 Odour

To minimize odour problem, the sludge tankers for disposal of sludge should be fully enclosed.

5.1.3 Noise

The contractor for the works will have to comply with the provisions of the Noise Control Ordinance. The contractor will be required to follow the good site practices, such as use of silenced plant and noise barriers near sensitive receivers, careful scheduling of activities, use of temporary acoustic barriers and acoustic machinery enclosures.

5.1.4 Liquid Effluents, Discharges or Contaminated Runoff

With regard to site surface runoff, good practices as given in the ProPECC PN 1/94 Construction Site Drainage should be followed as far as practicable in order to minimise the chance of erosion, and to retain and reduce suspended solids in the run-off before discharge.

The requirement of installation of silt curtains, the use of properly maintained closed mechanical grabs and the proper controlling of loading of barges and hoppers will be included in the contract documents.

5.1.5 Generation of Waste

In order to meet the relevant standards as specified in the Waste Disposal Ordinance, the following waste mitigation measures will be undertaken to minimise impacts from construction wastes arising from the Project:

- good waste management plan and practices will be devised and implemented;
- inert materials suitable for fill will be re-used, if possible;
- materials to be reused or recycled will be handled and stored in an appropriate manner to minimize contamination and loss;
- other construction waste/inert materials unsuitable for reuse or recycle will be disposed of properly; and
- chemical wastes will be stored and disposed of in accordance with approved method.

5.1.6 Unsightly Visual Appearance

There will be potential landscape impacts due to the proposed construction of STW and sewage pumping stations. Mitigation measures, such as the layout design of the STW and sewage pumping stations to minimize the removal of trees, should be implemented in order to reduce the impact on landscape during construction works. Hoarding will be erected at the site boundary of the STW and sewage pumping stations as far as practicable to minimize the visual impact due to construction activities.

5.1.7 Ecological and Cultural Heritage Impacts

The alignments of the proposed sewers/rising mains and sewerage facilities will avoid conflicts with areas of ecological concern, stream courses, archaeological sites and built heritage as far as practicable. Special caution will be paid to any construction activities planned near to or within these areas of ecological concern, stream courses, archaeological sites and built heritage. Extensive pre-cautionary measures will be required before implementation in order to ensure that the habitats in these areas and cultural heritage are not adversely affected. Ecological Impact Assessment and Heritage Impact Assessment of this Project will be carried out.

5.1.8 Traffic Impacts

Where works are carried out on roads, temporary traffic arrangement measures will be undertaken to maintain traffic flow and minimize traffic impacts.

5.1.9 Fisheries Impacts

Construction duration of submarine outfall will be shortened as far as practicable. Fisheries Impact Assessment of this Project will be carried out.

5.2 Operation Stage

5.2.1 Odour

Odour impact assessment will be conducted to identify the sources and impact to nearby sensitive receivers. Mitigation measures, such as covering up the major odour sources, providing adequate ventilation and odour removal system, may be implemented to reduce the odour impact.

5.2.2 Noise

To minimize any noise impacts generated from pump operation, all pumps will be enclosed in structures. Ventilation fans will be located away from the sensitive receivers as far as practicable.

5.2.3 Liquid Effluent Discharges

Water quality assessment will be conducted to analyze the impacts to the nearby sensitive receivers due to the discharge from the STW into the marine water. The discharge standards will be determined so as to improve the long-term water quality after the Project is commissioned.

5.2.4 Generation of Waste

Wastes generated during normal operation of the sewage pumping stations and STW will include screenings, grit and dewatered sludge. It is considered that the current practices controlling the disposal of these wastes to landfill could cater for the waste generation.

5.2.5 Storage, Use, Handling, Transport or Disposal of Hazardous Materials

In the STW, potential hazardous materials to be used, such as lubricant oil and chemicals (polymers), will be properly stored. The polymers will be used to make-up polymer solutions for use as aids in sludge dewatering. The adoption of current practices for controlling the storage and handling of potential hazardous materials will minimize the risk to life.

5.2.6 Risk of Accidents Resulting in Pollution

Standby treatment units and dual power supply arrangement, if feasible, will be provided in the Project to minimize the risks of accidents such as failure of power supply and equipment breakdown of the STW and sewage pumping stations.

An action plan should be prepared and followed in the event that pipe leakage is suspected or identified. Emergency storage capacity will be incorporated in the design of pumping stations to cater for pipeline repair.

Measures, such as installation of protective domes at outfall risers, will be properly incorporated in the design to minimize the risk of the submarine outfall being damaged by ship anchors, fish nets, etc.

5.2.7 Unsightly Visual Appearance

Tall structures will be avoided (but the exact profile of the STW and sewage pumping station to be determined). Architectural and landscaping features will be provided at the STW and sewage pumping stations with a view to achieving a harmonious design for the facilities to blend with the existing environment.

5.2.8 Fisheries Impacts

Submarine outfall will be designed to keep minimum disturbance to the existing seabed as far as practicable. Fisheries Impact Assessment of this Project will be carried out.

END OF TEXT

北
N

大嶼山
LANTAU ISLAND

貝澳
PUI O

鹹田
HAM TIN

磡石灣
SAN SHEK WAN

長沙
CHEUNG SHA

塘福
TONG FUK

水口
SHUI HAU

KAU NGA LING

PUI O WAN

Water Tunnel

SOUTH LANTAU ROAD

CHEUNG SHA BEACH

Sha Tsui

TONG FUK MIU WAN

SHUI HAU WAN

CHA KWO CHAU

圖例 :
LEGEND :

- 工程項目邊界 PROJECT BOUNDARY
- 擬議污水幹渠系統(無壓污水渠) PROPOSED TRUNK SEWERAGE (GRAVITY PIPES)
- 擬議污水幹渠系統(污水泵喉) PROPOSED TRUNK SEWERAGE (RISING MAINS)
- 擬議污水處理廠 PROPOSED SEWAGE TREATMENT WORKS
- 擬議經處理污水泵房 PROPOSED EFFLUENT PUMPING STATION
- 擬議污水泵房 PROPOSED SEWAGE PUMPING STATION
- 擬議鄉村污水收集系統泵房 PROPOSED VILLAGE SEWERAGE PUMPING STATION
- 擬議經處理污水管 PROPOSED EFFLUENT PIPE
- 擬議海底管道 PROPOSED SUBMARINE OUTFALL

圖則名稱 drawing title

331 DS - 離島污水收集系統第2階段 - 南大嶼山污水收集系統總平面圖
331 DS - OUTLYING ISLANDS SEWERAGE STAGE 2 - SOUTH LANTAU SEWERAGE GENERAL LAYOUT PLAN

繪畫 drawn	*ORIGINAL SIGNED* C.W. CHAN	日期 date	15-04-2009
核對 checked	*ORIGINAL SIGNED* P.W. CHAN	日期 date	15-04-2009
批核 approved	*ORIGINAL SIGNED* S.S. LAM	日期 date	15-04-2009
部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		

圖則編號 drawing no. DCM/2009/006

比例 scale N.T.S.

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION