

Drainage and Sewerage Impact Assessments Executive Summary

INTRODUCTION

The purpose of this report is to present the findings of Drainage and Sewerage Impact Assessment that has been carried out on the drainage and sewerage systems including the facilities in place or planned for the proposed Kwu Tung North (KTN), Fanling North (FLN) and Ping Che/Ta Kwu Ling (PC/TKL) New Development Areas (NDAs) in the North East New Territories (NENT).

DRAINAGE IMPACT ASSESSMENT

Design Criteria

The flood protection design and the analysis of the flood levels used in the assessment followed the Stormwater Drainage Manual of Drainage Services Department (DSD). The proposed drainage systems serving the NDAs will generally be designed for 1-in-50-year events. For those areas within NDAs which are under the influence of tidal backwater, e.g. along Shenzhen River and the rivers in the NDAs, the considered flood water level will take into account the combined tidal and fluvial flood probability.

Existing Conditions of the NDAs

For KTN NDA, the majority of the runoff from development is currently discharged to Sheung Yue River with small catchment on the west draining to Chau Tau Channel and on the north draining to Ma Tso Lung stream.

For FLN NDA, there is a series of urban catchments within Fanling and Sheung Shui, the runoff of which is being discharged to Ng Tung River.

For PC/TKL NDA, runoff from development is currently discharged to Ping Yuen River and its tributaries. As part of the drainage improvement works recommended under the “Northern New Territories Stormwater Drainage Master Plan Study” undertaken by DSD, Ping Yuen River and Tai Po Tin River will be trained. Improvement or upgrading works, such as training of river banks for Shui Hau River, which is a tributary of the Ping Yuen Main River, will be necessary under the proposed PC/TKL NDA.

Potential Drainage Impact

Additional stormwater runoff will be generated from the introduction of impermeable surfaces from the proposed development. A comprehensive drainage system has been proposed to replace the existing drainage channels and ditches inside the NDAs. The drainage system will be designed to convey the design flows not only from development site but also from upstream area to provide the design flood protection.

There will be an increase in surface runoff due to increase in paved areas. The drainage impacts associated with the proposed NDAs development have been assessed in the “Review of Drainage Master Plans in Yuen Long and North Districts” undertaken by DSD and the respective drainage improvement works at the surrounding areas of the NDAs were recommended. Within the NDAs, several existing drainage systems are found to have inadequate capacities and they will be upgraded or replaced by the proposed NDA drainage systems to match their land uses.

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Conclusions and Recommendations

A drainage impact assessment has been carried out for the RODPs for the three NDAs. A comprehensive review of the existing and planned drainage networks in the vicinity of the three NDAs together with their performance has been carried out. Close coordination with the “Review of Drainage Master Plans in Yuen Long and North Districts” has been maintained to identify the potential drainage impacts due to the NDAs Development.

To mitigate the drainage impacts, necessary drainage improvement works outside the NDAs have been recommended under the “Review of Drainage Master Plans in Yuen Long and North District” undertaken by DSD. Within the NDA areas, drainage mitigation measures have been proposed. These local drainage mitigation measures include: providing designated NDA drainage systems, necessary site formation works, improvement of existing drainage systems, drainage diversions, etc. The preliminary design of these local drainage mitigation measures will be carried out in the next stage upon reaching in-principle agreement on the RODPs for the three NDAs.

Based on this Stage 2 drainage impact assessment, it can be concluded that the proposed NDAs Development are feasible from drainage point of view.

SEWERAGE IMPACT ASSESSMENT

Design Criteria

The criteria are based on Environmental Protection Department’s Report No. EPD/TP 1/05 Guidelines for Estimating Sewage Flows (GESF). The main relevant criteria are listed below:

Unit Flow Factors – the factor for different land uses shall be in accordance with EPD’s GESF.

Catchment Inflow Factors – they are not applicable in estimating the total flows from the new development areas as stated in EPD’s GESF.

Peaking Factors – under *normal condition*, peaking factors (excluding stormwater allowance) are applicable for planning sewerage facilities receiving flow from new upstream sewerage systems. Under *unclear service conditions*, peaking factors (including stormwater allowance) shall be used. For *design purpose*, peaking factors (including stormwater allowance) will be used because the proposed sewerage system will also receive sewage flows from the existing villages.

Unit Load Factors – the global unit load factors are used to estimate the sewage loading from the proposed developments in accordance with EPD’s GESF.

Existing Conditions of the NDAs

For KTN NDA, the Western Trunk Sewer (WTS) along the Fanling Highway from Yin Kong to the junction with Po Shek Wu Road was completed under the North District Sewerage Stage 1 Phase 1. The construction of village sewerage connecting to the WTS was also scheduled to be carried out as part of the North District Sewerage Stage 1 Phase 1. The

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village sewerage works to Hang Tau, Ho Sheung Heung, Tsung Yuen and Kam Tsin is included in 4345DS – North District Sewerage Stage 2 Part 2A.

For FLN NDA, most of the area is currently unsewered as it is undeveloped and mainly located on the flood plain of River Indus.

For PC/TKL NDA, the area is served by an existing sewerage system connecting to the NENT Landfill leachate pumping station which conveys the flows to Shek Wu Hui Sewage Treatment Works (SWHSTW).

Potential Sewerage Impact

Based on the latest estimate, the proposed KTN, FLN and PC/TKL NDAs will generate an additional Average Dry Weather Flow (ADWF) of about 32,022m³/day, 14,551m³/day and 13,018m³/day respectively. The current treatment capacity of SWHSTW is 93,000m³/day which does not take into consideration the sewage flows from the NDAs Development and therefore the capacity of SWHSTW needs to be expanded. Also, taking account of the projected natural population growth in the vicinity, SWHSTW is proposed to be expanded to a capacity of 170,000m³/day ADWF. Apart from this, effluent standards of SWHSTW needs to be further tightened to meet the requirement of 'no net increase in pollution loading to Deep Bay'.

For PC/TKL NDA and its vicinity, an additional sewage treatment works, Ping Che Sewage Treatment Works (PCSTW), with a capacity 25,000m³/day is proposed for the collection, treatment, reuse and disposal of the sewage generated from the population intake. A tertiary treatment has been proposed to meet the stringent discharge standard under the 'no net increase in pollution loading to Deep Bay'.

Treated Sewage Effluent (TSE) reuse scheme has been recommended. The TSE from SHWSTW and PCSTW will be supplied to the three NDAs and North District for landscape irrigation, toilet flushing and make-up cooling water for proposed district cooling system (DCS). The projected demand of TSE reuse for KTN, FLN and PC/TKL NDAs are 13,900m³/day, 5,800m³/day and 5,000m³/day respectively. The water quality of the TSE will meet the stringent health standards. The implementation of TSE reuse scheme requires further liaison with WSD, EPD and DSD.

Conclusions and Recommendations

Based upon preliminary sewerage impact assessment, it can be concluded that the proposed NDAs Development is sustainable from sewerage collection, treatment, reuse and disposal perspectives. A new tertiary STW in PC/TKL NDA and its vicinity shall be provided for the collection and disposal of sewage from PC/TKL NDA. Expansion/upgrading of the SWHSTW to handle 170,000m³/day ADWF is necessary to cater for sewage flows from the KTN and FLN NDAs and also for additional flows due to base growth in the sewage catchment area. In addition, TSE reuse is recommended for landscape irrigation, toilet flushing and DCS cooling water in the NDAs which will be generated by the tertiary treatment of SWHSTW and PCSTW.

WAY FORWARD FOR DRAINAGE AND SEWERAGE IMPACT ASSESSMENTS

The following tasks will be undertaken in the next stage of assessments:

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- Detailed analysis of drainage impact and mitigation measures on existing drainage system;
- Further development of Drainage Master Layout Plan for respective NDAs;
- Further development of details of STWs after agreeing on the preferred alternative for collection, treatment and disposal of sewage;
- Further development of the Sewerage Master Layout Plan for respective NDAs;
- Development of the detailed implementation programme and staging of the works; and
- Continued liaison with WSD, EPD and DSD on TSE reuse scheme for extending to North District.