Appendix 6

Waste Management Assessment

Proposed Residential Development(s) with Retail, Public Vehicle Park and Social Welfare Facilities at Various Lots in D.D. 11 and Adjoining Government Land, Fung Yuen, Tai Po, New Territories

Waste Management Assessment

Prepared for:
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1. INTRODUCTION

1.1 Westwood Hong & Associates Ltd (WHA) was commissioned to conduct a Waste Management Assessment on the proposed residential development(s) with retail, public vehicle park and social welfare facilities (the "proposed Development") at various lots in DD11 and adjoining government land, Fung Yuen, Tai Po. This report is prepared to support the S.12A Application.

1.2 This S.12A application is to seek the Town Planning Board's approval for the proposed amendments to the Draft Tai Po Outline Zoning Plan No. S/TP/31 ("the OZP") for the proposed Development at various lots in D.D. 11 and adjoining Government Land in Fung Yuen, Tai Po, New Territories ("the Development Site"). The Development Site consists of two areas: Area (A) and Area (B).

1.3 The proposed Development will include residential development(s) with supporting retail and public vehicle park facilities in Area (A); and a social welfare complex comprising a Residential Care Home for the Elderly ("RCHE") and a Day Care Unit ("DCU") for the Elderly in Area (B).

1.4 The Applicant submitted an s.12A Planning Application (No. Y/TP/38) to TPB in 2022 to rezone the current western portion of the "CDA(1)" zone to "R(B)13" zone to enable a proposed residential development with retail facilities and public vehicle park, and a relaxation of the maximum building height restriction of the "G/IC" zone from 2 storeys to 8 storeys to the south of the "CDA(1)" zone for a proposed 8-storey Social Welfare Complex. While tremendous effort has been put to address and resolve the comments from Planning Department and relevant Government departments during circulation of the application, it is noted that majority of the Government departments have no further adverse comment on the technical assessments attached to Application No. Y/TP/38 since almost 3 years efforts being put by the Applicant & consultancy team.

1.5 Taking into account comments received from relevant Government departments and in order to achieve a wholistic planning scheme for the entire "CDA(1)" zone, the Applicant has put forward to include the CDA(1) Future Phase proposed in Application No. Y/TP/38 into the Development Site of this Application. The proposed Development Proposal in this Application is largely the same as that under Application No. Y/TP/38. The Development Site of this Application is solely formed by the previous development sites, i.e. Area (A), Area(B) and the "CDA(1)" Future Phase. The total GFA, PR, building height, no. of units and estimated population of the Development Proposal is almost exactly the same as that under Application No. Y/TP/38.

1.6 This report identifies the key waste management issues arising during construction and operation phase of the proposed Development. The major wastes would be construction and demolition (C&D) materials generated from excavation works. For wastes arising during operation phase of the proposed Development would be mainly municipal wastes. Mitigation measures and good site practice, including waste handling, storage and disposal, are recommended with reference to the applicable legislation and guidelines.

2. STATUTORY LEGISLATION

2.1 Waste collection and disposal are covered by the Waste Disposal Ordinance (Cap. 354) (WDO). Under the WDO, wastes can only be disposed of at designated waste disposal facilities licensed by EPD. The WDO also stipulates the requirements for issuing licenses for the collection and transportation of wastes. The contractor would be responsible for the disposal of waste.

2.2 The following legislation relates to the handling, treatment and disposal of wastes in the Hong Kong SAR and has been used in assessing potential environmental impacts:

- Waste Disposal Ordinance (Cap. 354)
- Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C)
- Land (Miscellaneous Provisions) Ordinance (Cap. 28)
- Public Health and Municipal Services Ordinance (Cap. 132) – Public Cleansing and Prevention of Nuisances Regulation

2.3 Table 2.1 summarises other documents and guidelines related to waste management and disposal that will be followed by the proposed Development:-

Table 2.1 Other Relevant Documents and Guidelines to be Followed

Bureau / Department	Documents / Guidelines / Technical Circulars
EPD	• Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (2023) • A Guide to the Registration of Chemical Waste Producers (2023) • A Guide to the Chemical Waste Control Scheme (2023)
EPD / CEDD	• New Disposal Arrangements for Construction Waste (1992)
PlanD	• Hong Kong Planning Standards and Guidelines (2024)
Buildings Department	• ADV-19, Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers – Construction and Demolition Waste
Development Bureau	• DEVB TC(W) No. 6/2010, Trip Ticket System for Disposal of Construction & Demolition Materials (2010)

3. ASSESSMENT METHODOLOGY

3.1 The assessment methodology for reviewing the waste management implications during construction and operation phases include:-

- Identification / estimation of the types and quantities of waste arising from Project;
- Addressing impacts caused by handling (including stockpiling, labelling, packaging, and storage), collection, transportation and reuse/disposal of wastes in detail and propose appropriate mitigation measures;
- Adoption of waste management hierarchy with priorities towards waste reduction, on-site or off-site reuse, and recycling;
- Estimation of the types and quantities of wastes required to be disposed of and their disposal method; and
- Assessment of the impacts on the capacity of waste collection, transfer, and disposal facilities.

4. POTENTIAL IMPACTS AND MITIGATION MEASURES DURING CONSTRUCTION PHASE

Quantity of Waste

4.1 The construction works of the proposed Development mainly include site excavation for the 3-storey basement carpark underneath T1 and T3, site foundation works and superstructure construction.

4.2 Construction & Demolition (C&D) materials generated from the construction of the proposed Development which comprise inert and non-inert C&D materials. The inert portion, such as soil, rock, concrete etc, namely inert C&D materials, could be reused on-site as filling materials or off-site as public fill at public fill reception facilities. The non-inert portion, such as timber formwork, paper, vegetation, etc, namely non-inert C&D materials will be reused or recycled as far as possible prior to disposal at landfill, and landfill disposal will be considered as the last resort for waste handling.

4.3 The estimated quantity of C&D materials for site excavation, foundation works and superstructure construction are provided in Table 4.1.

Table 4.1 Estimated Quantity of Waste to be Generated

Development Stage	Waste Type	Total Amount Generated (m^3)	Total Amount Reused On-site (m^3)	Total Amount Disposed / Delivered to Public Fill Reception Facility (m^3)	Recommended Outlets
Site Excavation [1]	Inert C&D Material	128,372	19,256	109,116	- To be reused on-site for site formation [6] - Except those inert C&D waste to be reused on-site, others are expected to be delivered to the public fill reception facility.
	Non-Inert C&D Materials	9,662	290	9,372	- To be reused on-site for site formation. Remaining to be disposed to NENT Landfill [5] - Timber/woody materials to be sent to Y-Park before disposal to NENT Landfill
Site Foundation Work	Inert C&D Material [2]	3,057	459	2,598	- To be reused on-site for site formation [6] - Except those inert C&D waste to be reused on-site, others are expected to be delivered to the public fill reception facility.
	Non-Inert C&D Materials	230	161	69	- To be reused on-site for site formation. Remaining to be disposed to NENT Landfill [5] - Timber/woody materials to be sent to Y-Park before disposal to NENT Landfill
Superstructure Construction [3]	Inert C&D Material [2]	7,134	1070	6064	- To be reused on-site for site formation [6] - Except those inert C&D waste to be reused on-site, others are expected to be delivered to the public fill reception facility.
	Non-Inert C&D Materials	537	376	161	- To be reused on-site for site formation. Remaining to be disposed to NENT Landfill [5] - Timber/woody materials to be sent to Y-Park before disposal to NENT Landfill

Development Stage	Waste Type	Total Amount Generated (m^3)	Total Amount Reused Off-site (m^3)	Total Amount Disposed (m^3)	Recommended Outlets
General Refuse from Workforce	110 tons [4]		5 tons	105 tons	To be disposed to NENT Landfill. And the reused part to be collected by recycler.
Chemical Waste	-	A few hundred kilograms / litres per month		A few hundred kilograms / litres per month	To be collected by a licensed chemical waste collector and disposed of at a licensed chemical waste treatment and disposal facility.

Note:

[1] Total site area is 31,854m^2, approximately 1/3 of development area will have basement area (including 3 storeys basement carpark together with a sewage treatment plant) which required excavation, and will generate excavated soil (inert C&D materials). Excavated sediment is not anticipated.

[2] According to the Hong Kong Polytechnic (March 1993) Reduction of Construction Waste Final Report, waste generation rate is 0.1m^3 per 1m^2 of GFA constructed. The GFA of the proposed Development is 109,577m^2 (91,390m^2 + 18,187m^2), there would be 10,958m^3 total C&D materials generated.

[3] Wood from formworks and packaging is included in superstructure construction.

[4] It is assumed that the generation rate of general refuse is 0.65kg per worker per day. With approximately 130 workers and 1,300 construction days, there would be total 109,850kg general refuse generated throughout the construction period.

[5] The recyclables will be sorted out separately for proper recycling before disposal to the landfill

[6] The current ground levels of the project site are in the range of 6 – 10mPD, while the future development ground will be in the range of 6 – 12mPD. Approximately 1/3 of the development area will have 2m site formation that required filling materials (the northern part of the site).

Construction & Demolition Waste

4.4 The reuse and recycling of C&D materials on-site will be maximized. Stockpiling areas of inert C&D materials on-site will be provided for subsequent backfilling and reuse on site. For topsoil, they would be reused for site formation and roadworks. For vegetation, felled trees, twigs and branches, which are classified as yard waste, will be sent to Y-Park for recycling prior to disposal at the designated landfill site. The C&D materials to be reused on site would stockpile by enclosing and covering, particularly during inclement weather.

4.5 It is presently anticipated that some of the C&D materials will need to be transported off-site for re-use, recycling and disposal by trucks. With the implementation of the dust and noise control / mitigation measures, such as covering and stockpiling materials to avoid dust and other nuisance impacts from truck movements, these secondary environmental factors are not expected to be a concern.

4.6 Measures have been introduced in ADV-19 to enhance the management of C&D materials and to minimize its generation at source. The enhancement measures include the identification of opportunities to prevent waste during both the project planning and design stage as well as construction stage, and preparing of a Waste Management Plan (WMP) to ensure that measures are implemented during the construction stage for reduction of C&D materials. The WMP will be submitted to the Project Engineer / Architect / Authorized Persons for approval according to ADV-19.

4.7 A trip-ticket system according to the ADV-19 will be implemented during the construction phase to monitor the disposal of C&D materials and solid wastes at the public fill reception facilities and landfills and to control fly-tipping. The real-time tracking and monitoring devices will be equipped on the dump trucks for monitoring the transportation of C&D materials.

4.8 The Contractor will adopt good housekeeping practices such as waste segregation prior to disposal. Stockpiling and segregating areas will be provided at the site. Waste storage areas will be well maintained and cleaned regularly.

4.9 Whenever there are excess recyclable construction materials, including bricks, plastics and metals, re-use and recycling will be carried out for waste minimisation. Other recyclable inert C&D materials such as concrete, asphalt, etc. will be sorted and treated as necessary for on-site usage. Non-inert C&D materials will be sorted and delivered to or collected by registered recycle collectors for proper recycling of the waste. Specifically, non-inert C&D materials such as timber and woody materials, which would be significantly generated during site clearance since the project site is predominantly rural in character, will be sent to the Yard Waste Recycling Centre in Y-Park for recycling prior to disposal at the designated landfill site. C&D materials will be stored on-site before re-use or disposal where possible. Available site area to allow on-site sorting and storage areas will be provided at locations away from public areas.

4.10 It is presently anticipated that some of the C&D materials will need to be transported off-site for re-use, recycling and disposal by trucks. With the implementation of the dust and noise control / mitigation measures, such as proper handling and packaging of wastes according to good practices and guidelines for different types of waste, covering and stockpiling materials to avoid dust and other nuisance impacts from truck movements, these secondary environmental factors are not expected to be a concern.

4.11 The storage, handling, transport and disposal of all C&D materials, if not managed properly, would have the potential to create visual, dust and water quality impacts. With proper implementation of good construction site practice and mitigation measures recommended in above sections, potential dust, noise and water quality impacts associated with on-site handling and transportation of all C&D materials are not anticipated.

Chemical Waste

4.12 Chemical waste from maintenance and servicing of construction equipment / plant may be generated. If chemical waste is produced, the Contractor would be required to register with the EPD as a Chemical Waste Producer, and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

4.13 Appropriate containers with proper labels should be used for storage of chemical wastes. Chemical wastes should be collected and delivered to designated outlet by a licensed collector. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical wastes that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre (CWTC) at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

4.14 Any unused chemicals or those with remaining functional capacity should be collected for reuse as far as possible.

General Refuse

4.15 General refuse such as food scraps, wastepaper, empty containers, etc. would be generated from the workforce during construction phase. Such refuse will be properly managed so intentional or accidental release to the surrounding environment does not occur. Effective collection of site wastes would be required to prevent waste materials from being blown around by wind, flushed or leached into nearby waters, or creating an odour nuisance or pest and vermin problem. Specifically for food waste, which is the main source of generating unpleasant odour and causing environmental hygiene concern, it would be classified as recyclables and separated from other waste, in order to facilitate the recycling of food waste on-site and off-site. Waste storage areas will be well maintained and cleaned regularly. Table 4.1 shows the estimated quantity of general refuse from workforce to be generated during the construction phase. Recycling will be conducted for the general refuse prior to landfill disposal.

4.16 General refuse will be stored in enclosed bins or compaction units separate from C&D materials. A reputable waste collector will be employed by the Contractor to remove general refuse from the Site, separately from C&D materials. Preferably an enclosed and covered area will be provided to reduce the occurrence of "windblown" light materials.

4.17 With the implementation of the recommended waste management practices at the site, no adverse environmental impact arising from the storage, handling and transportation of refuse is anticipated.

5. POTENTIAL IMPACTS AND MITIGATION MEASURES DURING OPERATION PHASE

5.1 The proposed Development consists of 7 residential towers and a social welfare complex block. The major type of wastes generated from the operation phase is general refuse. General refuse will be removed on regular basis to minimize odour, pest and litter impacts. Recycling would be proposed prior to landfill disposal. To promote recycling of wastepaper, aluminum cans and plastic bottles, the recycling bins (such as those available from EPD) will be clearly labelled and placed at convenient locations. The recyclable materials will then be collected by reliable waste recycling agents on a regular basis. Waste generated will be disposed to public landfill, either West New Territories Landfill or North East New Territories Landfill.

5.2 Based on the Monitoring of Solid Waste in Hong Kong – Waste Statistics for 2023, the municipal solid waste generated per capita per day was 1.44 kg/person/day. The proposed Development consists of 7 residential blocks with building height ranged from 24 to 30 storeys, with a total of 1,988 residential units. The estimated overall population intake in the proposed Development will be around 5,169 persons, which is derived by assuming 2.6 persons per flat as per the average household size in the latest Population Census published by the Census and Statistics Department. Including the employment population with approximately 100 persons, the estimated quantities of municipal solid waste anticipated during the operation phase will be 7,587 kg/day. According to the Plate 3.2 of Waste Statistics for 2023, the recovery rate of municipal solid waste is 33%. It is therefore estimated that 33% of municipal solid waste (i.e. 2,504 kg/day) could be reused and recycled. Clinical waste and chemical waste would be anticipated from the proposed social welfare facilities, these wastes would be collected by a licensed collector.

5.3 The waste management hierarchy is a concept which shows the desirability of various waste management methods and shall be adopted by the building management to manage domestic waste in a sustainable manner in line with government policy. In order of preference, the following shall be adopted:-

- Avoidance
- Minimisation
- Recycling/ reuse

5.4 The majority of waste generated during the operation of the proposed Development will be domestic waste, comprising general refuse, food waste, food packaging, paper, cans, plastic bottles, etc. These shall be collected and stored in recycle bins and appropriate waste receptacles with a secure lid to minimise the potential adverse impact due to wind blowing away garbage and to improve hygiene.

5.5 Recyclable and non-recyclable waste will be regularly collected by waste collectors and taken off-site for recycling or disposal, respectively.

6. CONCLUSION

6.1 With the implementation of control measures in Sections 4 and 5, adverse waste management implication is not anticipated during construction and operation phases.