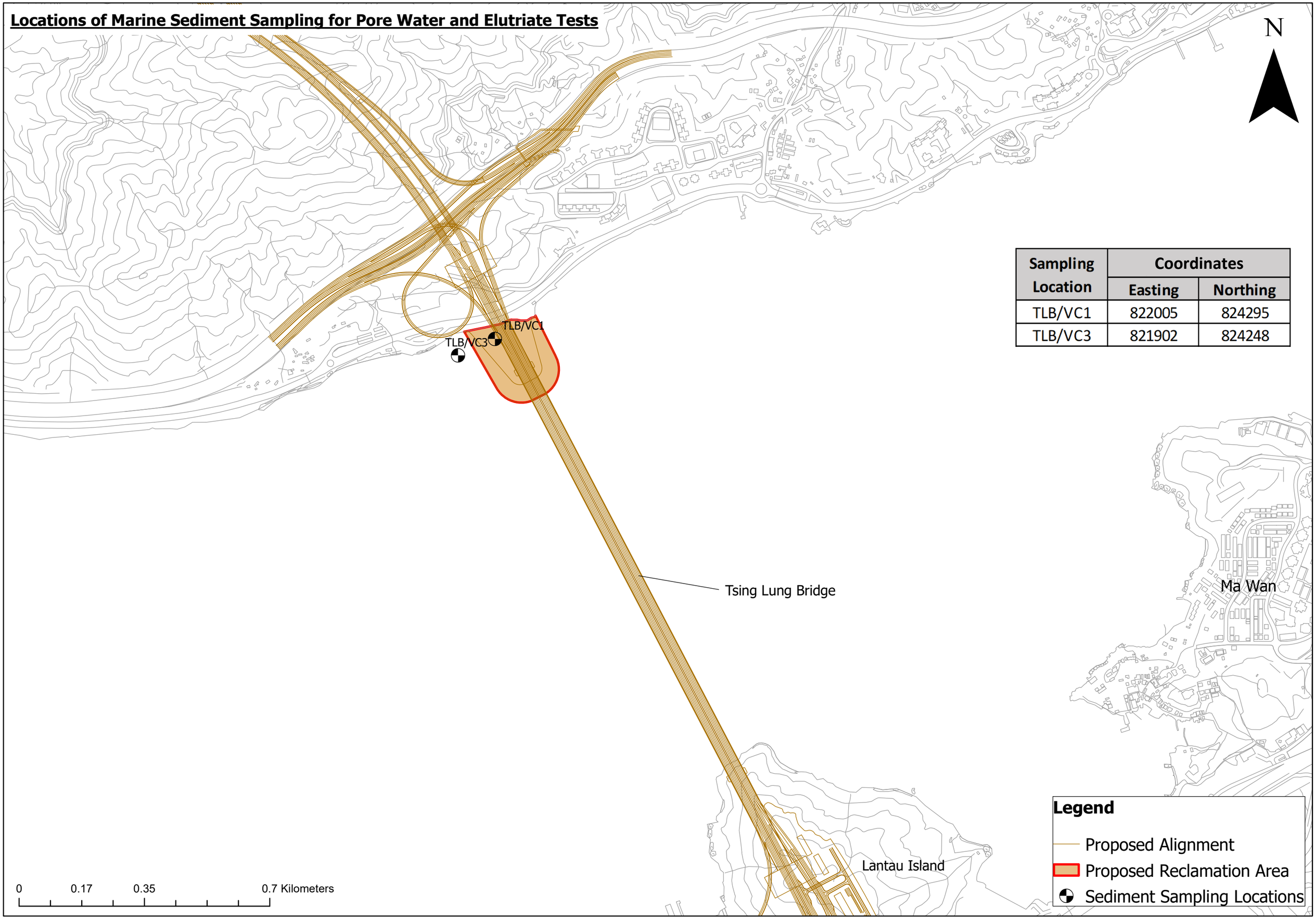
Locations of Marine Sediment Sampling for Pore Water and Elutriate Tests



Sampling Location	Coordinates	
	Easting	Northing
TLB/VC1	822005	824295
TLB/VC3	821902	824248

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Sample ID: TLB/VC3 Surface Sampling date / time: 26-Sep-2022 11:00 HK2238012-001	TLB/VC1 Surface 26-Sep-2022 14:00 HK2238012-002	---	---	---
EA/ED: Physical and Aggregate Properties								
EA002: pH Value	---	0.1	pH Unit	7.7	7.6	---	---	---
ED/EK: Inorganic Nonmetallic Parameters								
EK055K: Ammonia as N	7664-41-7	0.01	mg/L	12.5	9.62	---	---	---
EK057A: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	---	---	---
EK058A: Nitrate as N	14797-55-8	0.01	mg/L	0.19	0.05	---	---	---
EK061P: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	14.9	14.1	---	---	---
EK067P: Total Phosphorus as P	---	0.01	mg/L	0.34	0.42	---	---	---
EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	---	---	---
EG: Metals and Major Cations - Filtered								
EG029: Arsenic	7440-38-2	1	µg/L	6	7	---	---	---
EG029: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	---	---	---
EG029: Chromium	7440-47-3	1.0	µg/L	<1.0	<1.0	---	---	---
EG029: Copper	7440-50-8	1.0	µg/L	1.1	2.1	---	---	---
EG029: Lead	7439-92-1	1.0	µg/L	<1.0	<1.0	---	---	---
EG029: Nickel	7440-02-0	1.0	µg/L	1.7	3.3	---	---	---
EG029: Silver	7440-22-4	1.0	µg/L	<1.0	<1.0	---	---	---
EG029: Zinc	7440-66-6	1	µg/L	1	2	---	---	---
EG038: Mercury	7439-97-6	0.05	µg/L	<0.05	<0.05	---	---	---
EP-065: PCB Single Congeners								
EP065: PCB 8	34883-43-7	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 18	37680-65-2	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 28	7012-37-5	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 44	41464-39-5	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 52	35693-99-3	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 66	32598-10-0	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 77	32598-13-3	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 101	37680-73-2	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 105	32598-14-4	0.01	µg/L	<0.01	<0.01	---	---	---

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Sample ID: TLB/VC3 Surface Sampling date / time: 26-Sep-2022 11:00 HK2238012-001	TLB/VC1 Surface 26-Sep-2022 14:00 HK2238012-002	---	---	---
EP-065: PCB Single Congeners - Continued								
EP065: PCB 118	31508-00-6	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 126	57465-28-8	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 128	38380-07-3	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 138	35065-28-2	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 153	35065-27-1	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 169	32774-16-6	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 170	35065-30-6	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 180	35065-29-3	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: PCB 187	52663-68-0	0.01	µg/L	<0.01	<0.01	---	---	---
EP065: Total Polychlorinated biphenyls	---	0.18	µg/L	<0.18	<0.18	---	---	---
EP-067A: Organochlorine Pesticides (OC)								
EP067: alpha-BHC	319-84-6	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: beta-BHC	319-85-7	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: delta-BHC	319-86-8	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: gamma-BHC	58-89-9	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: Heptachlor	76-44-8	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: Aldrin	309-00-2	0.100	µg/L	<0.100	<0.100	---	---	---
EP067: Heptachlor epoxide	1024-57-3	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: Endosulfan 1	959-98-8	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: 4.4`-DDE	72-55-9	0.100	µg/L	<0.100	<0.100	---	---	---
EP067: 4.4`-DDD	72-54-8	0.100	µg/L	<0.100	<0.100	---	---	---
EP067: Endosulfan sulfate	1031-07-8	0.10	µg/L	<0.10	<0.10	---	---	---
EP067: 4.4`-DDT	50-29-3	0.100	µg/L	<0.100	<0.100	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
EP076HK: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	---	---	---
EP076HK: Acenaphthylene	208-96-8	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Acenaphthene	83-32-9	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Fluorene	86-73-7	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	---	---	---
EP076HK: Anthracene	120-12-7	0.2	µg/L	<0.2	<0.2	---	---	---

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Sample ID: TLB/VC3 Surface Sampling date / time: 26-Sep-2022 11:00 HK2238012-001	TLB/VC1 Surface 26-Sep-2022 14:00 HK2238012-002	---	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued								
EP076HK: Fluoranthene	206-44-0	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Chrysene	218-01-9	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<0.2	<0.2	---	---	---
EP076HK: Low M.W. PAHs	---	2.2	µg/L	<2.2	<2.2	---	---	---
EP076HK: High M.W. PAHs	---	6.8	µg/L	<6.8	<6.8	---	---	---
EP-390: Triorganotins								
EP390: Tributyltin	56573-85-4	0.015	µg TBT /L	<0.015	<0.015	---	---	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates								
EP076HK: Phenol-d6	13127-88-3	0.1	%	64.3	68.6	---	---	---
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%	65.4	76.7	---	---	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%	104	104	---	---	---
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate								
EP065: Decachlorobiphenyl	2051-24-3	0.01	%	78.1	80.7	---	---	---
EP-067S: Pesticide Surrogate								
EP067: Tetrachlorometaxylene	877-09-8	0.1	%	98.2	67.4	---	---	---
EP067: Dibutylchlorendate	1770-80-5	0.1	%	112	85.2	---	---	---

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4636935)								
HK2240393-001	Anonymous	EA002: pH Value	---	0.1	pH Unit	4.5	4.5	0.0
HK2238012-001	TLB/VC3 Surface	EA002: pH Value	---	0.1	pH Unit	7.7	7.7	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)								
HK2238315-003	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)								
HK2238315-003	Anonymous	EK055K: Ammonia as N	7664-41-7	0.01	mg/L	0.13	0.13	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)								
HK2238315-003	Anonymous	EK057A: Nitrite as N	14797-65-0	0.01	mg/L	0.04	0.05	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)								
HK2238319-004	Anonymous	EK067P: Total Phosphorus as P	---	0.01	mg/L	0.04	0.04	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)								
HK2238011-002	Anonymous	EG038: Mercury	7439-97-6	0.05	µg/L	<0.05	<0.05	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)								
HK2238011-002	Anonymous	EG029: Cadmium	7440-43-9	0.1	µg/L	<0.2	<0.2	0.0
		EG029: Silver	7440-22-4	0.1	µg/L	<1.0	<1.0	0.0
		EG029: Chromium	7440-47-3	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Copper	7440-50-8	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Lead	7439-92-1	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Nickel	7440-02-0	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Arsenic	7440-38-2	1	µg/L	3	3	0.0
		EG029: Zinc	7440-66-6	1	µg/L	<1	<1	0.0
EP-390: Triorganotins (QC Lot: 4651339)								
HK2240016-001	Anonymous	Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.015	<0.015	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits(%) Low	High	RPD (%) Value	Control Limit

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.9	----	93.5	104	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)											
EK055K: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	97.0	----	91.0	108	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)											
EK057A: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.05 mg/L	103	----	78.8	120	----	----
				<0.01	0.4 mg/L	101	----	96.3	108	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	98.7	----	94.9	102	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)											
EG038: Mercury	7439-97-6	0.05	µg/L	<0.05	0.05 µg/L	102	----	85.0	115	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)											
EG029: Arsenic	7440-38-2	1	µg/L	<1	10 µg/L	107	----	85.0	115	----	----
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	106	----	85.0	115	----	----
EG029: Chromium	7440-47-3	0.2	µg/L	<0.2	10 µg/L	109	----	85.0	115	----	----
EG029: Copper	7440-50-8	0.2	µg/L	<0.2	10 µg/L	107	----	85.0	115	----	----
EG029: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	105	----	85.0	115	----	----
EG029: Nickel	7440-02-0	0.2	µg/L	<0.2	10 µg/L	99.7	----	85.0	115	----	----
EG029: Silver	7440-22-4	0.1	µg/L	<0.1	10 µg/L	106	----	85.0	115	----	----
EG029: Zinc	7440-66-6	1	µg/L	<1	10 µg/L	103	----	85.0	115	----	----
EP-065: PCB Single Congeners (QC Lot: 4648472)											
PCB 8	34883-43-7	0.01	µg/L	<0.01	0.1 µg/L	82.9	----	39.0	100	----	----
PCB 18	37680-65-2	0.01	µg/L	<0.01	0.1 µg/L	95.3	----	41.0	97.0	----	----
PCB 28	7012-37-5	0.01	µg/L	<0.01	0.1 µg/L	97.6	----	49.0	103	----	----
PCB 44	41464-39-5	0.01	µg/L	<0.01	0.1 µg/L	78.8	----	47.0	115	----	----
PCB 52	35693-99-3	0.01	µg/L	<0.01	0.1 µg/L	85.3	----	47.0	110	----	----
PCB 66	32598-10-0	0.01	µg/L	<0.01	0.1 µg/L	61.3	----	47.0	127	----	----
PCB 77	32598-13-3	0.01	µg/L	<0.01	0.1 µg/L	101	----	58.0	118	----	----
PCB 101	37680-73-2	0.01	µg/L	<0.01	0.1 µg/L	102	----	62.0	113	----	----
PCB 105	32598-14-4	0.01	µg/L	<0.01	0.1 µg/L	97.6	----	60.0	121	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-065: PCB Single Congeners (QC Lot: 4648472) - Continued											
PCB 118	31508-00-6	0.01	µg/L	<0.01	0.1 µg/L	98.3	----	62.0	116	----	----
PCB 126	57465-28-8	0.01	µg/L	<0.01	0.1 µg/L	101	----	58.0	119	----	----
PCB 128	38380-07-3	0.01	µg/L	<0.01	0.1 µg/L	99.1	----	55.0	132	----	----
PCB 138	35065-28-2	0.01	µg/L	<0.01	0.1 µg/L	98.1	----	60.0	122	----	----
PCB 153	35065-27-1	0.01	µg/L	<0.01	0.1 µg/L	97.9	----	62.0	121	----	----
PCB 169	32774-16-6	0.01	µg/L	<0.01	0.1 µg/L	100	----	59.0	122	----	----
PCB 170	35065-30-6	0.01	µg/L	<0.01	0.1 µg/L	99.7	----	59.0	125	----	----
PCB 180	35065-29-3	0.01	µg/L	<0.01	0.1 µg/L	99.6	----	56.0	127	----	----
PCB 187	52663-68-0	0.01	µg/L	<0.01	0.1 µg/L	98.4	----	55.0	125	----	----
Total Polychlorinated biphenyls	----	0.18	µg/L	<0.18	----	----	----	----	----	----	----
EP-067A: Organochlorine Pesticides (OC) (QC Lot: 4648473)											
alpha-BHC	319-84-6	0.05	µg/L	<0.05	0.1 µg/L	68.4	----	50.0	120	----	----
beta-BHC	319-85-7	0.05	µg/L	<0.05	0.1 µg/L	74.6	----	50.0	130	----	----
delta-BHC	319-86-8	0.05	µg/L	<0.05	0.1 µg/L	104	----	35.0	120	----	----
gamma-BHC	58-89-9	0.05	µg/L	<0.05	0.1 µg/L	63.0	----	50.0	130	----	----
Heptachlor	76-44-8	0.05	µg/L	<0.05	0.1 µg/L	57.2	----	21.0	120	----	----
Aldrin	309-00-2	0.05	µg/L	<0.050	0.1 µg/L	59.0	----	35.0	120	----	----
Heptachlor epoxide	1024-57-3	0.05	µg/L	<0.05	0.1 µg/L	79.1	----	29.0	120	----	----
Endosulfan I	959-98-8	0.05	µg/L	<0.05	0.1 µg/L	85.4	----	32.0	120	----	----
4,4'-DDE	72-55-9	0.0025	µg/L	<0.0025	0.1 µg/L	71.1	----	36.0	120	----	----
4,4'-DDD	72-54-8	0.0025	µg/L	<0.0025	0.1 µg/L	63.2	----	38.0	120	----	----
Endosulfan sulfate	1031-07-8	0.05	µg/L	<0.05	0.1 µg/L	62.8	----	37.0	120	----	----
4,4'-DDT	50-29-3	0.005	µg/L	<0.005	0.1 µg/L	63.1	----	27.0	120	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4648471)											
Naphthalene	91-20-3	0.1	µg/L	<0.1	0.5 µg/L	92.4	----	73.0	113	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	0.5 µg/L	93.5	----	74.0	115	----	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	0.5 µg/L	93.4	----	77.0	113	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	0.5 µg/L	90.6	----	72.0	114	----	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	0.5 µg/L	89.5	----	70.0	112	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4648471) - Continued											
Anthracene	120-12-7	0.1	µg/L	<0.1	0.5 µg/L	94.0	----	78.0	115	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	0.5 µg/L	94.6	----	72.0	118	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	0.5 µg/L	93.5	----	72.0	117	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	0.5 µg/L	85.5	----	69.0	118	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	0.5 µg/L	94.1	----	69.0	120	----	----
Benzo(b)fluoranthene	205-99-2	0.1	µg/L	<0.1	0.5 µg/L	86.9	----	64.0	119	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	0.5 µg/L	96.6	----	64.0	120	----	----
Benzo(a)pyrene	50-32-8	0.1	µg/L	<0.1	0.5 µg/L	90.0	----	61.0	120	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	0.5 µg/L	70.9	----	48.0	108	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	0.5 µg/L	81.8	----	44.0	111	----	----
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	0.5 µg/L	78.6	----	44.0	114	----	----
Low M.W. PAHs	----	2.2	µg/L	<2.2	----	----	----	----	----	----	----
High M.W. PAHs	----	6.8	µg/L	<6.8	----	----	----	----	----	----	----
EP-390: Triorganotins (QC Lot: 4651339)											
Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.012	0.0122 µg TBT /L	83.7	----	70.0	130	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)										
HK2238315-003	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)										
HK2238315-003	Anonymous	EK055K: Ammonia as N	7664-41-7	0.5 mg/L	98.0	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)										
HK2238315-003	Anonymous	EK057A: Nitrite as N	14797-65-0	0.25 mg/L	103	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)										
HK2238319-004	Anonymous	EK067P: Total Phosphorus as P	----	0.5 mg/L	96.2	----	75.0	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)										
HK2238011-001	Anonymous	EG038: Mercury	7439-97-6	0.05 µg/L	99.0	----	75.0	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)										
HK2238011-001	Anonymous	EG029: Arsenic	7440-38-2	10 µg/L	104	----	75.0	120	----	----
		EG029: Cadmium	7440-43-9	10 µg/L	102	----	75.0	125	----	----
		EG029: Chromium	7440-47-3	10 µg/L	105	----	75.0	125	----	----
		EG029: Copper	7440-50-8	10 µg/L	98.0	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	97.6	----	75.0	125	----	----
		EG029: Nickel	7440-02-0	10 µg/L	101	----	75.0	125	----	----
		EG029: Silver	7440-22-4	10 µg/L	103	----	75.0	120	----	----
		EG029: Zinc	7440-66-6	10 µg/L	106	----	75.0	125	----	----
EP-390: Triorganotins (QC Lot: 4651339)										
HK2240016-001	Anonymous	Tributyltin	56573-85-4	0.0122 µg TBT /L	103	----	70.0	130	----	----

Surrogate Control Limits

Sub-Matrix: WATER

Compound	CAS Number	Recovery Limits (%)	
		Low	High

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
Phenol-d6	13127-88-3	50	130
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130
EP-067S: Pesticide Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd
Contact	: EDWARD LEE	Contact	: Richard Fung
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com
Telephone	: ----	Telephone	: +852 2610 1044
Facsimile	: ----	Facsimile	: +852 2610 2021
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION	Date Samples Received	: 26-Sep-2022
Order number	: HY/2022/09/LAB/ENV/01	Quote number	: HKE/1667/2022_V3
		Issue Date	: 26-Oct-2022
C-O-C number	: ----	No. of samples received	: 2
Site	: ENVIRONMENTAL TESTING FOR MARINE SEDIMENTS AND WATER AT TSING LUNG TAU	No. of samples analysed	: 2

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Organics_ENV, Kwai Tsing

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General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 26-Sep-2022 to 25-Oct-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2238011

Sediment sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition at 16:25 on 26 September, 2022. The result(s) related only to the item(s) tested.

Seawater sample(TLB/VC1) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition at 15:45 on 27 September, 2022. The result(s) related only to the item(s) tested.

Seawater sample(TLB/VC3) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition at 15:50 on 28 September, 2022. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Elutriate sample(s) were filtered prior to dissolved metal analysis.

Water sample(s) were filtered prior to dissolved metal analysis.

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EA002 - Calibration range of pH value is 4.0 - 10.0. Results exceeding this range is for reference only.

EA002 - pH value is reported as at 25°C.

TBT result(s) (Method: EP390) is/are reported on as received basis.

Analytical Results

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	LOR	Unit	Sample ID	TLB/VC3 Surface	TLB/VC1 Surface	---	---	---
				Sampling date / time	26-Sep-2022 11:00	26-Sep-2022 14:00	---	---	---
					HK2238011-001	HK2238011-002	------	------	------
EA/ED: Physical and Aggregate Properties									
EA002: pH Value	---	0.1	pH Unit		7.6	7.9	---	---	---
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as N	7664-41-7	0.01	mg/L		1.56	1.39	---	---	---
EK057A: Nitrite as N	14797-65-0	0.01	mg/L		0.03	0.04	---	---	---
EK058A: Nitrate as N	14797-55-8	0.01	mg/L		0.16	0.13	---	---	---
EK061P: Total Kjeldahl Nitrogen as N	---	0.1	mg/L		2.4	2.3	---	---	---
EK067P: Total Phosphorus as P	---	0.01	mg/L		0.14	0.13	---	---	---
EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L		0.05	0.02	---	---	---
EG: Metals and Major Cations - Filtered									
EG029: Arsenic	7440-38-2	1	µg/L		2	3	---	---	---
EG029: Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	---	---	---
EG029: Chromium	7440-47-3	1.0	µg/L		<1.0	<1.0	---	---	---
EG029: Copper	7440-50-8	1.0	µg/L		2.2	<1.0	---	---	---
EG029: Lead	7439-92-1	1.0	µg/L		<1.0	<1.0	---	---	---
EG029: Nickel	7440-02-0	1.0	µg/L		1.5	<1.0	---	---	---
EG029: Silver	7440-22-4	1.0	µg/L		<1.0	<1.0	---	---	---
EG029: Zinc	7440-66-6	1	µg/L		<1	<1	---	---	---
EG038: Mercury	7439-97-6	0.05	µg/L		<0.05	<0.05	---	---	---
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 18	37680-65-2	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 28	7012-37-5	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 44	41464-39-5	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 52	35693-99-3	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 66	32598-10-0	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 77	32598-13-3	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 101	37680-73-2	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 105	32598-14-4	0.01	µg/L		<0.01	<0.01	---	---	---

Sub-Matrix: ELUTRIATE

Compound	CAS Number	LOR	Unit	Sample ID	TLB/VC3 Surface	TLB/VC1 Surface	---	---	---
				Sampling date / time	26-Sep-2022 11:00	26-Sep-2022 14:00	---	---	---
					HK2238011-001	HK2238011-002	------	------	------
EP-065: PCB Single Congeners - Continued									
EP065: PCB 118	31508-00-6	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 126	57465-28-8	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 128	38380-07-3	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 138	35065-28-2	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 153	35065-27-1	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 169	32774-16-6	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 170	35065-30-6	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 180	35065-29-3	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: PCB 187	52663-68-0	0.01	µg/L		<0.01	<0.01	---	---	---
EP065: Total Polychlorinated biphenyls	---	0.18	µg/L		<0.18	<0.18	---	---	---
EP-067A: Organochlorine Pesticides (OC)									
EP067: alpha-BHC	319-84-6	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: beta-BHC	319-85-7	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: delta-BHC	319-86-8	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: gamma-BHC	58-89-9	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: Heptachlor	76-44-8	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: Aldrin	309-00-2	0.100	µg/L		<0.100	<0.100	---	---	---
EP067: Heptachlor epoxide	1024-57-3	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: Endosulfan 1	959-98-8	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: 4.4`-DDE	72-55-9	0.100	µg/L		<0.100	<0.100	---	---	---
EP067: 4.4`-DDD	72-54-8	0.100	µg/L		<0.100	<0.100	---	---	---
EP067: Endosulfan sulfate	1031-07-8	0.10	µg/L		<0.10	<0.10	---	---	---
EP067: 4.4`-DDT	50-29-3	0.100	µg/L		<0.100	<0.100	---	---	---
EP-076HK: Polycydic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	0.1	µg/L		<0.1	<0.1	---	---	---
EP076HK: Acenaphthylene	208-96-8	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Acenaphthene	83-32-9	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Fluorene	86-73-7	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Phenanthrene	85-01-8	0.1	µg/L		<0.1	<0.1	---	---	---
EP076HK: Anthracene	120-12-7	0.2	µg/L		<0.2	<0.2	---	---	---

Sub-Matrix: ELUTRIATE

Compound	CAS Number	LOR	Unit	Sample ID	TLB/VC3 Surface	TLB/VC1 Surface	---	---	---
				Sampling date / time	26-Sep-2022 11:00	26-Sep-2022 14:00	---	---	---
					HK2238011-001	HK2238011-002	------	------	------
EP-076HK: Polycydic Aromatic Hydrocarbons (PAHs) - Continued									
EP076HK: Fluoranthene	206-44-0	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Pyrene	129-00-0	0.1	µg/L		<0.1	<0.1	---	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Chrysene	218-01-9	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Benzo(k)fluoranthene	207-08-9	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Benzo(a)pyrene	50-32-8	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Benzo(g.h.i)perylene	191-24-2	0.2	µg/L		<0.2	<0.2	---	---	---
EP076HK: Low M.W. PAHs	---	2.2	µg/L		<2.2	<2.2	---	---	---
EP076HK: High M.W. PAHs	---	6.8	µg/L		<6.8	<6.8	---	---	---
EP-390: Triorganotins									
EP390: Tributyltin	56573-85-4	0.015	µg TBT /L		<0.015	<0.015	---	---	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: Phenol-d6	13127-88-3	0.1	%		63.5	60.5	---	---	---
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		76.4	74.9	---	---	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		110	108	---	---	---
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.01	%		88.1	80.7	---	---	---
EP-067S: Pesticide Surrogate									
EP067: Tetrachlorometaxylene	877-09-8	0.1	%		69.1	59.0	---	---	---
EP067: Dibutylchlorendate	1770-80-5	0.1	%		102	100	---	---	---

Laboratory Duplicate (DUP) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4636935)								
HK2240393-001	Anonymous	EA002: pH Value	---	0.1	pH Unit	4.5	4.5	0.0
HK2238012-001	Anonymous	EA002: pH Value	---	0.1	pH Unit	7.7	7.7	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)								
HK2238315-003	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)								
HK2238315-003	Anonymous	EK055K: Ammonia as N	7664-41-7	0.01	mg/L	0.13	0.13	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)								
HK2238315-003	Anonymous	EK057A: Nitrite as N	14797-65-0	0.01	mg/L	0.04	0.05	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)								
HK2238319-004	Anonymous	EK067P: Total Phosphorus as P	---	0.01	mg/L	0.04	0.04	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)								
HK2238011-002	TLB/VC1 Surface	EG038: Mercury	7439-97-6	0.05	µg/L	<0.05	<0.05	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)								
HK2238011-002	TLB/VC1 Surface	EG029: Cadmium	7440-43-9	0.1	µg/L	<0.2	<0.2	0.0
		EG029: Silver	7440-22-4	0.1	µg/L	<1.0	<1.0	0.0
		EG029: Chromium	7440-47-3	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Copper	7440-50-8	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Lead	7439-92-1	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Nickel	7440-02-0	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Arsenic	7440-38-2	1	µg/L	3	3	0.0
		EG029: Zinc	7440-66-6	1	µg/L	<1	<1	0.0
EP-390: Triorganotins (QC Lot: 4651339)								
HK2240016-001	Anonymous	Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.015	<0.015	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	Spike Recovery (%): DCS	Recovery Limits(%): Low	Recovery Limits(%): High	RPD (%): Value	RPD (%): Control Limit

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	Spike Recovery (%): DCS	Recovery Limits(%): Low	Recovery Limits(%): High	RPD (%): Value	RPD (%): Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.9	---	93.5	104	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)											
EK055K: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	97.0	---	91.0	108	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)											
EK057A: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.05 mg/L	103	---	78.8	120	---	---
				<0.01	0.4 mg/L	101	---	96.3	108	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)											
EK067P: Total Phosphorus as P	---	0.01	mg/L	<0.01	0.5 mg/L	98.7	---	94.9	102	---	---
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)											
EG038: Mercury	7439-97-6	0.05	µg/L	<0.05	0.05 µg/L	102	---	85.0	115	---	---
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)											
EG029: Arsenic	7440-38-2	1	µg/L	<1	10 µg/L	107	---	85.0	115	---	---
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	106	---	85.0	115	---	---
EG029: Chromium	7440-47-3	0.2	µg/L	<0.2	10 µg/L	109	---	85.0	115	---	---
EG029: Copper	7440-50-8	0.2	µg/L	<0.2	10 µg/L	107	---	85.0	115	---	---
EG029: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	105	---	85.0	115	---	---
EG029: Nickel	7440-02-0	0.2	µg/L	<0.2	10 µg/L	99.7	---	85.0	115	---	---
EG029: Silver	7440-22-4	0.1	µg/L	<0.1	10 µg/L	106	---	85.0	115	---	---
EG029: Zinc	7440-66-6	1	µg/L	<1	10 µg/L	103	---	85.0	115	---	---
EP-065: PCB Single Congeners (QC Lot: 4648472)											
PCB 8	34883-43-7	0.01	µg/L	<0.01	0.1 µg/L	82.9	---	39.0	100	---	---
PCB 18	37680-65-2	0.01	µg/L	<0.01	0.1 µg/L	95.3	---	41.0	97.0	---	---
PCB 28	7012-37-5	0.01	µg/L	<0.01	0.1 µg/L	97.6	---	49.0	103	---	---
PCB 44	41464-39-5	0.01	µg/L	<0.01	0.1 µg/L	78.8	---	47.0	115	---	---
PCB 52	35693-99-3	0.01	µg/L	<0.01	0.1 µg/L	85.3	---	47.0	110	---	---
PCB 66	32598-10-0	0.01	µg/L	<0.01	0.1 µg/L	61.3	---	47.0	127	---	---
PCB 77	32598-13-3	0.01	µg/L	<0.01	0.1 µg/L	101	---	58.0	118	---	---
PCB 101	37680-73-2	0.01	µg/L	<0.01	0.1 µg/L	102	---	62.0	113	---	---
PCB 105	32598-14-4	0.01	µg/L	<0.01	0.1 µg/L	97.6	---	60.0	121	---	---

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-065: PCB Single Congeners (QC Lot: 4648472) - Continued											
PCB 118	31508-00-6	0.01	µg/L	<0.01	0.1 µg/L	98.3	----	62.0	116	----	----
PCB 126	57465-28-8	0.01	µg/L	<0.01	0.1 µg/L	101	----	58.0	119	----	----
PCB 128	38380-07-3	0.01	µg/L	<0.01	0.1 µg/L	99.1	----	55.0	132	----	----
PCB 138	35065-28-2	0.01	µg/L	<0.01	0.1 µg/L	98.1	----	60.0	122	----	----
PCB 153	35065-27-1	0.01	µg/L	<0.01	0.1 µg/L	97.9	----	62.0	121	----	----
PCB 169	32774-16-6	0.01	µg/L	<0.01	0.1 µg/L	100	----	59.0	122	----	----
PCB 170	35065-30-6	0.01	µg/L	<0.01	0.1 µg/L	99.7	----	59.0	125	----	----
PCB 180	35065-29-3	0.01	µg/L	<0.01	0.1 µg/L	99.6	----	56.0	127	----	----
PCB 187	52663-68-0	0.01	µg/L	<0.01	0.1 µg/L	98.4	----	55.0	125	----	----
Total Polychlorinated biphenyls	----	0.18	µg/L	<0.18	----	----	----	----	----	----	----
EP-067A: Organochlorine Pesticides (OC) (QC Lot: 4648473)											
alpha-BHC	319-84-6	0.05	µg/L	<0.05	0.1 µg/L	68.4	----	50.0	120	----	----
beta-BHC	319-85-7	0.05	µg/L	<0.05	0.1 µg/L	74.6	----	50.0	130	----	----
delta-BHC	319-86-8	0.05	µg/L	<0.05	0.1 µg/L	104	----	35.0	120	----	----
gamma-BHC	58-89-9	0.05	µg/L	<0.05	0.1 µg/L	63.0	----	50.0	130	----	----
Heptachlor	76-44-8	0.05	µg/L	<0.05	0.1 µg/L	57.2	----	21.0	120	----	----
Aldrin	309-00-2	0.05	µg/L	<0.050	0.1 µg/L	59.0	----	35.0	120	----	----
Heptachlor epoxide	1024-57-3	0.05	µg/L	<0.05	0.1 µg/L	79.1	----	29.0	120	----	----
Endosulfan 1	959-98-8	0.05	µg/L	<0.05	0.1 µg/L	85.4	----	32.0	120	----	----
4.4`-DDE	72-55-9	0.0025	µg/L	<0.0025	0.1 µg/L	71.1	----	36.0	120	----	----
4.4`-DDD	72-54-8	0.0025	µg/L	<0.0025	0.1 µg/L	63.2	----	38.0	120	----	----
Endosulfan sulfate	1031-07-8	0.05	µg/L	<0.05	0.1 µg/L	62.8	----	37.0	120	----	----
4.4`-DDT	50-29-3	0.005	µg/L	<0.005	0.1 µg/L	63.1	----	27.0	120	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4648471)											
Naphthalene	91-20-3	0.1	µg/L	<0.1	0.5 µg/L	92.4	----	73.0	113	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	0.5 µg/L	93.5	----	74.0	115	----	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	0.5 µg/L	93.4	----	77.0	113	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	0.5 µg/L	90.6	----	72.0	114	----	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	0.5 µg/L	89.5	----	70.0	112	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4648471) - Continued											
Anthracene	120-12-7	0.1	µg/L	<0.1	0.5 µg/L	94.0	----	78.0	115	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	0.5 µg/L	94.6	----	72.0	118	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	0.5 µg/L	93.5	----	72.0	117	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	0.5 µg/L	85.5	----	69.0	118	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	0.5 µg/L	94.1	----	69.0	120	----	----
Benzo(b)fluoranthene	205-99-2	0.1	µg/L	<0.1	0.5 µg/L	86.9	----	64.0	119	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	0.5 µg/L	96.6	----	64.0	120	----	----
Benzo(a)pyrene	50-32-8	0.1	µg/L	<0.1	0.5 µg/L	90.0	----	61.0	120	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	0.5 µg/L	70.9	----	48.0	108	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	0.5 µg/L	81.8	----	44.0	111	----	----
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	0.5 µg/L	78.6	----	44.0	114	----	----
Low M.W. PAHs	----	2.2	µg/L	<2.2	----	----	----	----	----	----	----
High M.W. PAHs	----	6.8	µg/L	<6.8	----	----	----	----	----	----	----
EP-390: Triorganotins (QC Lot: 4651339)											
Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.012	0.0122 µg TBT /L	83.7	----	70.0	130	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)										
HK2238315-003	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)										
HK2238315-003	Anonymous	EK055K: Ammonia as N	7664-41-7	0.5 mg/L	98.0	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)										
HK2238315-003	Anonymous	EK057A: Nitrite as N	14797-65-0	0.25 mg/L	103	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)										
HK2238319-004	Anonymous	EK067P: Total Phosphorus as P	----	0.5 mg/L	96.2	----	75.0	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)										
HK2238011-001	TLB/VC3 Surface	EG038: Mercury	7439-97-6	0.05 µg/L	99.0	----	75.0	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)										
HK2238011-001	TLB/VC3 Surface	EG029: Arsenic	7440-38-2	10 µg/L	104	----	75.0	120	----	----
		EG029: Cadmium	7440-43-9	10 µg/L	102	----	75.0	125	----	----
		EG029: Chromium	7440-47-3	10 µg/L	105	----	75.0	125	----	----
		EG029: Copper	7440-50-8	10 µg/L	98.0	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	97.6	----	75.0	125	----	----
		EG029: Nickel	7440-02-0	10 µg/L	101	----	75.0	125	----	----
		EG029: Silver	7440-22-4	10 µg/L	103	----	75.0	120	----	----
		EG029: Zinc	7440-66-6	10 µg/L	106	----	75.0	125	----	----
EP-390: Triorganotins (QC Lot: 4651339)										
HK2240016-001	Anonymous	Tributyltin	56573-85-4	0.0122 µg TBT /L	103	----	70.0	130	----	----

Surrogate Control Limits

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	Recovery Limits (%)	
		Low	High

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
Phenol-d6	13127-88-3	50	130
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130
EP-067S: Pesticide Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 11
Contact	: EDWARD LEE	Contact	: Richard Fung	Work Order	: HK2238315
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION			Date Samples Received	: 27-Sep-2022
Order number	: HY/2022/09/LAB/ENV/01	Quote number	: HKE/1667/2022_V3	Issue Date	: 26-Oct-2022
C-O-C number	: ----			No. of samples received	: 3
Site	: ENVIRONMENTAL TESTING FOR MARINE SEDIMENTS AND WATER AT TSING LUNG TAU			No. of samples analysed	: 3

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Organics_ENV, Kwai Tsing

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General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 27-Sep-2022 to 25-Oct-2022.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2238315

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Elutriate sample(s) were filtered prior to dissolved metal analysis.

Water sample(s) were filtered prior to dissolved metal analysis.

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EA002 - Calibration range of pH value is 4.0 - 10.0. Results exceeding this range is for reference only.

EA002 - pH value is reported as at 25°C.

TBT result(s) (Method: EP390) is/are reported on as received basis.

Analytical Results

Sub-Matrix: ELUTRIATE

Compound	CAS Number	LOR	Unit	Sample ID	TLB/VC1 0.00-0.45, 0.50-0.95	TLB/VC1 1.00-1.45, 1.50-1.95	TLB/VC1 Seawater blank	---	---
				Sampling date / time	27-Sep-2022 11:30	27-Sep-2022 12:10	27-Sep-2022 14:30	---	---
					HK2238315-001	HK2238315-002	HK2238315-003	------	------
EA/ED: Physical and Aggregate Properties									
EA002: pH Value	---	0.1	pH Unit		8.3	8.2	7.9	---	---
ED/EK: Inorganic Nonmetallic Parameters									
EK055K: Ammonia as N	7664-41-7	0.01	mg/L		0.25	0.17	0.13	---	---
EK057A: Nitrite as N	14797-65-0	0.01	mg/L		0.04	0.04	0.04	---	---
EK058A: Nitrate as N	14797-55-8	0.01	mg/L		0.18	0.16	0.16	---	---
EK061P: Total Kjeldahl Nitrogen as N	---	0.1	mg/L		0.6	0.6	0.5	---	---
EK067P: Total Phosphorus as P	---	0.01	mg/L		0.08	0.09	0.06	---	---
EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L		0.04	0.02	0.02	---	---
EG: Metals and Major Cations - Filtered									
EG029: Arsenic	7440-38-2	1	µg/L		15	6	2	---	---
EG029: Cadmium	7440-43-9	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EG029: Chromium	7440-47-3	1.0	µg/L		<1.0	<1.0	<1.0	---	---
EG029: Copper	7440-50-8	1.0	µg/L		<1.0	<1.0	5.1	---	---
EG029: Lead	7439-92-1	1.0	µg/L		1.0	<1.0	<1.0	---	---
EG029: Nickel	7440-02-0	1.0	µg/L		1.3	<1.0	<1.0	---	---
EG029: Silver	7440-22-4	1.0	µg/L		<1.0	<1.0	<1.0	---	---
EG029: Zinc	7440-66-6	1	µg/L		131	69	35	---	---
EG038: Mercury	7439-97-6	0.05	µg/L		<0.05	<0.05	<0.05	---	---
EP-065: PCB Single Congeners									
EP065: PCB 8	34883-43-7	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 18	37680-65-2	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 28	7012-37-5	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 44	41464-39-5	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 52	35693-99-3	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 66	32598-10-0	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 77	32598-13-3	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 101	37680-73-2	0.01	µg/L		<0.01	<0.01	<0.01	---	---

Sub-Matrix: ELUTRIATE

Compound	CAS Number	LOR	Unit	Sample ID	TLB/VC1 0.00-0.45, 0.50-0.95	TLB/VC1 1.00-1.45, 1.50-1.95	TLB/VC1 Seawater blank	---	---
				Sampling date / time	27-Sep-2022 11:30	27-Sep-2022 12:10	27-Sep-2022 14:30	---	---
					HK2238315-001	HK2238315-002	HK2238315-003	------	------
EP-065: PCB Single Congeners - Continued									
EP065: PCB 105	32598-14-4	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 118	31508-00-6	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 126	57465-28-8	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 128	38380-07-3	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 138	35065-28-2	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 153	35065-27-1	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 169	32774-16-6	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 170	35065-30-6	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 180	35065-29-3	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: PCB 187	52663-68-0	0.01	µg/L		<0.01	<0.01	<0.01	---	---
EP065: Total Polychlorinated biphenyls	---	0.18	µg/L		<0.18	<0.18	<0.18	---	---
EP-067A: Organochlorine Pesticides (OC)									
EP067: alpha-BHC	319-84-6	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: beta-BHC	319-85-7	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: delta-BHC	319-86-8	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: gamma-BHC	58-89-9	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: Heptachlor	76-44-8	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: Aldrin	309-00-2	0.100	µg/L		<0.100	<0.100	<0.100	---	---
EP067: Heptachlor epoxide	1024-57-3	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: Endosulfan 1	959-98-8	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: 4.4`-DDE	72-55-9	0.100	µg/L		<0.100	<0.100	<0.100	---	---
EP067: 4.4`-DDD	72-54-8	0.100	µg/L		<0.100	<0.100	<0.100	---	---
EP067: Endosulfan sulfate	1031-07-8	0.10	µg/L		<0.10	<0.10	<0.10	---	---
EP067: 4.4`-DDT	50-29-3	0.100	µg/L		<0.100	<0.100	<0.100	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
EP076HK: Naphthalene	91-20-3	0.1	µg/L		<0.1	<0.1	<0.1	---	---
EP076HK: Acenaphthylene	208-96-8	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Acenaphthene	83-32-9	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Fluorene	86-73-7	0.2	µg/L		<0.2	<0.2	<0.2	---	---

Sub-Matrix: **ELUTRIATE**

				Sample ID	TLB/VC1 0.00-0.45, 0.50-0.95	TLB/VC1 1.00-1.45, 1.50-1.95	TLB/VC1 Seawater blank	---	---
				Sampling date / time	27-Sep-2022 11:30	27-Sep-2022 12:10	27-Sep-2022 14:30	---	---
Compound	CAS Number	LOR	Unit		HK2238315-001	HK2238315-002	HK2238315-003	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) - Continued									
EP076HK: Phenanthrene	85-01-8	0.1	µg/L		<0.1	<0.1	<0.1	---	---
EP076HK: Anthracene	120-12-7	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Fluoranthene	206-44-0	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Pyrene	129-00-0	0.1	µg/L		<0.1	<0.1	<0.1	---	---
EP076HK: Benz(a)anthracene	56-55-3	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Chrysene	218-01-9	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Benzo(b)fluoranthene	205-99-2	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Benzo(k)fluoranthene	207-08-9	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Benzo(a)pyrene	50-32-8	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Dibenz(a.h)anthracene	53-70-3	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Benzo(g.h.i)perylene	191-24-2	0.2	µg/L		<0.2	<0.2	<0.2	---	---
EP076HK: Low M.W. PAHs	---	2.2	µg/L		<2.2	<2.2	<2.2	---	---
EP076HK: High M.W. PAHs	---	6.8	µg/L		<6.8	<6.8	<6.8	---	---
EP-390: Triorganotins									
EP390: Tributyltin	56573-85-4	0.015	µg TBT /L		<0.015	<0.015	<0.015	---	---
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									
EP076HK: Phenol-d6	13127-88-3	0.1	%		83.6	88.5	59.3	---	---
EP076HK: 2-Fluorobiphenyl	321-60-8	0.1	%		93.4	99.6	65.8	---	---
EP076HK: 4-Terphenyl-d14	1718-51-0	0.1	%		118	119	116	---	---
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate									
EP065: Decachlorobiphenyl	2051-24-3	0.01	%		88.9	88.4	91.8	---	---
EP-067S: Pesticide Surrogate									
EP067: Tetrachlorometaxylene	877-09-8	0.1	%		77.7	91.0	65.0	---	---
EP067: Dibutylchlorendate	1770-80-5	0.1	%		108	105	113	---	---

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4636935)								
HK2240393-001	Anonymous	EA002: pH Value	---	0.1	pH Unit	4.5	4.5	0.0
HK2238012-001	Anonymous	EA002: pH Value	---	0.1	pH Unit	7.7	7.7	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)								
HK2238315-003	TLB/VC1 Seawater blank	EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)								
HK2238315-003	TLB/VC1 Seawater blank	EK055K: Ammonia as N	7664-41-7	0.01	mg/L	0.13	0.13	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)								
HK2238315-003	TLB/VC1 Seawater blank	EK057A: Nitrite as N	14797-65-0	0.01	mg/L	0.04	0.05	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)								
HK2238319-004	Anonymous	EK067P: Total Phosphorus as P	---	0.01	mg/L	0.04	0.04	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)								
HK2238011-002	Anonymous	EG038: Mercury	7439-97-6	0.05	µg/L	<0.05	<0.05	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)								
HK2238011-002	Anonymous	EG029: Cadmium	7440-43-9	0.1	µg/L	<0.2	<0.2	0.0
		EG029: Silver	7440-22-4	0.1	µg/L	<1.0	<1.0	0.0
		EG029: Chromium	7440-47-3	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Copper	7440-50-8	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Lead	7439-92-1	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Nickel	7440-02-0	0.2	µg/L	<1.0	<1.0	0.0
		EG029: Arsenic	7440-38-2	1	µg/L	3	3	0.0
		EG029: Zinc	7440-66-6	1	µg/L	<1	<1	0.0
EP-390: Triorganotins (QC Lot: 4651339)								
HK2240016-001	Anonymous	Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.015	<0.015	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits(%) Low	High	RPD (%) Value	Control Limit

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits(%) Low	High	RPD (%) Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.9	---	93.5	104	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)											
EK055K: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	97.0	---	91.0	108	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)											
EK057A: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.05 mg/L	103	---	78.8	120	---	---
				<0.01	0.4 mg/L	101	---	96.3	108	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)											
EK067P: Total Phosphorus as P	---	0.01	mg/L	<0.01	0.5 mg/L	98.7	---	94.9	102	---	---
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)											
EG038: Mercury	7439-97-6	0.05	µg/L	<0.05	0.05 µg/L	102	---	85.0	115	---	---
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)											
EG029: Arsenic	7440-38-2	1	µg/L	<1	10 µg/L	107	---	85.0	115	---	---
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	106	---	85.0	115	---	---
EG029: Chromium	7440-47-3	0.2	µg/L	<0.2	10 µg/L	109	---	85.0	115	---	---
EG029: Copper	7440-50-8	0.2	µg/L	<0.2	10 µg/L	107	---	85.0	115	---	---
EG029: Lead	7439-92-1	0.2	µg/L	<0.2	10 µg/L	105	---	85.0	115	---	---
EG029: Nickel	7440-02-0	0.2	µg/L	<0.2	10 µg/L	99.7	---	85.0	115	---	---
EG029: Silver	7440-22-4	0.1	µg/L	<0.1	10 µg/L	106	---	85.0	115	---	---
EG029: Zinc	7440-66-6	1	µg/L	<1	10 µg/L	103	---	85.0	115	---	---
EP-065: PCB Single Congeners (QC Lot: 4648472)											
PCB 8	34883-43-7	0.01	µg/L	<0.01	0.1 µg/L	82.9	---	39.0	100	---	---
PCB 18	37680-65-2	0.01	µg/L	<0.01	0.1 µg/L	95.3	---	41.0	97.0	---	---
PCB 28	7012-37-5	0.01	µg/L	<0.01	0.1 µg/L	97.6	---	49.0	103	---	---
PCB 44	41464-39-5	0.01	µg/L	<0.01	0.1 µg/L	78.8	---	47.0	115	---	---
PCB 52	35693-99-3	0.01	µg/L	<0.01	0.1 µg/L	85.3	---	47.0	110	---	---
PCB 66	32598-10-0	0.01	µg/L	<0.01	0.1 µg/L	61.3	---	47.0	127	---	---
PCB 77	32598-13-3	0.01	µg/L	<0.01	0.1 µg/L	101	---	58.0	118	---	---
PCB 101	37680-73-2	0.01	µg/L	<0.01	0.1 µg/L	102	---	62.0	113	---	---
PCB 105	32598-14-4	0.01	µg/L	<0.01	0.1 µg/L	97.6	---	60.0	121	---	---

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report Spike Concentration	Spike Recovery (%) LCS	DCS	Recovery Limits(%) Low	High	RPD (%) Value	Control Limit
EP-065: PCB Single Congeners (QC Lot: 4648472) - Continued											
PCB 118	31508-00-6	0.01	µg/L	<0.01	0.1 µg/L	98.3	---	62.0	116	---	---
PCB 126	57465-28-8	0.01	µg/L	<0.01	0.1 µg/L	101	---	58.0	119	---	---
PCB 128	38380-07-3	0.01	µg/L	<0.01	0.1 µg/L	99.1	---	55.0	132	---	---
PCB 138	35065-28-2	0.01	µg/L	<0.01	0.1 µg/L	98.1	---	60.0	122	---	---
PCB 153	35065-27-1	0.01	µg/L	<0.01	0.1 µg/L	97.9	---	62.0	121	---	---
PCB 169	32774-16-6	0.01	µg/L	<0.01	0.1 µg/L	100	---	59.0	122	---	---
PCB 170	35065-30-6	0.01	µg/L	<0.01	0.1 µg/L	99.7	---	59.0	125	---	---
PCB 180	35065-29-3	0.01	µg/L	<0.01	0.1 µg/L	99.6	---	56.0	127	---	---
PCB 187	52663-68-0	0.01	µg/L	<0.01	0.1 µg/L	98.4	---	55.0	125	---	---
Total Polychlorinated biphenyls	---	0.18	µg/L	<0.18	---	---	---	---	---	---	---
EP-067A: Organochlorine Pesticides (OC) (QC Lot: 4648473)											
alpha-BHC	319-84-6	0.05	µg/L	<0.05	0.1 µg/L	68.4	---	50.0	120	---	---
beta-BHC	319-85-7	0.05	µg/L	<0.05	0.1 µg/L	74.6	---	50.0	130	---	---
delta-BHC	319-86-8	0.05	µg/L	<0.05	0.1 µg/L	104	---	35.0	120	---	---
gamma-BHC	58-89-9	0.05	µg/L	<0.05	0.1 µg/L	63.0	---	50.0	130	---	---
Heptachlor	76-44-8	0.05	µg/L	<0.05	0.1 µg/L	57.2	---	21.0	120	---	---
Aldrin	309-00-2	0.05	µg/L	<0.050	0.1 µg/L	59.0	---	35.0	120	---	---
Heptachlor epoxide	1024-57-3	0.05	µg/L	<0.05	0.1 µg/L	79.1	---	29.0	120	---	---
Endosulfan 1	959-98-8	0.05	µg/L	<0.05	0.1 µg/L	85.4	---	32.0	120	---	---
4.4`-DDE	72-55-9	0.0025	µg/L	<0.0025	0.1 µg/L	71.1	---	36.0	120	---	---
4.4`-DDD	72-54-8	0.0025	µg/L	<0.0025	0.1 µg/L	63.2	---	38.0	120	---	---
Endosulfan sulfate	1031-07-8	0.05	µg/L	<0.05	0.1 µg/L	62.8	---	37.0	120	---	---
4.4`-DDT	50-29-3	0.005	µg/L	<0.005	0.1 µg/L	63.1	---	27.0	120	---	---
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4648471)											
Naphthalene	91-20-3	0.1	µg/L	<0.1	0.5 µg/L	92.4	---	73.0	113	---	---
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	0.5 µg/L	93.5	---	74.0	115	---	---
Acenaphthene	83-32-9	0.1	µg/L	<0.1	0.5 µg/L	93.4	---	77.0	113	---	---
Fluorene	86-73-7	0.1	µg/L	<0.1	0.5 µg/L	90.6	---	72.0	114	---	---
Phenanthrene	85-01-8	0.1	µg/L	<0.1	0.5 µg/L	89.5	---	70.0	112	---	---

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4648471) - Continued											
Anthracene	120-12-7	0.1	µg/L	<0.1	0.5 µg/L	94.0	----	78.0	115	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	0.5 µg/L	94.6	----	72.0	118	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	0.5 µg/L	93.5	----	72.0	117	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	0.5 µg/L	85.5	----	69.0	118	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	0.5 µg/L	94.1	----	69.0	120	----	----
Benzo(b)fluoranthene	205-99-2	0.1	µg/L	<0.1	0.5 µg/L	86.9	----	64.0	119	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	0.5 µg/L	96.6	----	64.0	120	----	----
Benzo(a)pyrene	50-32-8	0.1	µg/L	<0.1	0.5 µg/L	90.0	----	61.0	120	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	0.5 µg/L	70.9	----	48.0	108	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	0.5 µg/L	81.8	----	44.0	111	----	----
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	0.5 µg/L	78.6	----	44.0	114	----	----
Low M.W. PAHs	----	2.2	µg/L	<2.2	----	----	----	----	----	----	----
High M.W. PAHs	----	6.8	µg/L	<6.8	----	----	----	----	----	----	----
EP-390: Triorganotins (QC Lot: 4651339)											
Tributyltin	56573-85-4	0.0122	µg TBT /L	<0.012	0.0122 µg TBT /L	83.7	----	70.0	130	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638499)										
HK2238315-003	TLB/VC1 Seawater blank	**EK071K: Reactive Phosphorus as P**	14265-44-2	0.5 mg/L	103	---	75.0	125	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638500)										
HK2238315-003	TLB/VC1 Seawater blank	**EK055K: Ammonia as N**	7664-41-7	0.5 mg/L	98.0	---	75.0	125	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4638916)										
HK2238315-003	TLB/VC1 Seawater blank	**EK057A: Nitrite as N**	14797-65-0	0.25 mg/L	103	---	75.0	125	---	---
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4645910)										
HK2238319-004	Anonymous	**EK067P: Total Phosphorus as P**	---	0.5 mg/L	96.2	---	75.0	125	---	---
EG: Metals and Major Cations - Filtered (QC Lot: 4630010)										
HK2238011-001	Anonymous	**EG038: Mercury**	7439-97-6	0.05 µg/L	99.0	---	75.0	125	---	---
EG: Metals and Major Cations - Filtered (QC Lot: 4630202)										
HK2238011-001	Anonymous	**EG029: Arsenic**	7440-38-2	10 µg/L	104	---	75.0	120	---	---
		EG029: Cadmium	7440-43-9	10 µg/L	102	---	75.0	125	---	---
		EG029: Chromium	7440-47-3	10 µg/L	105	---	75.0	125	---	---
		EG029: Copper	7440-50-8	10 µg/L	98.0	---	75.0	125	---	---
		EG029: Lead	7439-92-1	10 µg/L	97.6	---	75.0	125	---	---
		EG029: Nickel	7440-02-0	10 µg/L	101	---	75.0	125	---	---
		EG029: Silver	7440-22-4	10 µg/L	103	---	75.0	120	---	---
		EG029: Zinc	7440-66-6	10 µg/L	106	---	75.0	125	---	---
EP-390: Triorganotins (QC Lot: 4651339)										
HK2240016-001	Anonymous	**Tributyltin**	56573-85-4	0.0122 µg TBT /L	103	---	70.0	130	---	---

Surrogate Control Limits

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	Recovery Limits (%)	
		Low	High

Sub-Matrix: **ELUTRIATE**

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
Phenol-d6	13127-88-3	50	130
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-065S: PCB Congeners and Organochlorine Pesticides Surrogate			
Decachlorobiphenyl	2051-24-3	50	130
EP-067S: Pesticide Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 9
Contact	: EDWARD LEE	Contact	: Richard Fung	Work Order	: HK2300346
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION			Date Samples Received	: 04-Jan-2023
Order number	: HY/2022/09/WQM/01	Quote number	: HKE/1667/2022_V3	Issue Date	: 18-Jan-2023
C-O-C number	: ----			No. of samples received	: 4
Site	: WATER QUALITY MONITORING AT 3 LOCATIONS			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV, Kwai Tsing

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General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 04-Jan-2023 to 18-Jan-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2300346

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Microbiological sample(s) was/ were collected in 250mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 15:30.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EK061P - The accredited LOR of Total Kjeldahl Nitrogen is 0.1mg/L. Results reported below 0.1mg/L and the decimal value of the results were for reference only.

EK062P - The accredited LOR of Total Nitrogen is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EK071K - The accredited LOR of Reactive Phosphorus is 0.01mg/L. Results reported below LOR and with decimal value of the results are for reference only.

EK085 - The accredited LOR of Total Sulphide is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EP020 - The accredited LOR of Oil and Grease is 2mg/L. Results reported below LOR and with decimal value are for reference only.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below LOR and with decimal value are for reference only.

Water sample(s) digested by in-house method E-3005 prior to the determination of total metals. The in-house method is developed based on USEPA method 3005.

EA025 - The accredited LOR of Total Suspended Solids is 0.5mg/L. Results below this LOR are for reference only.

Analytical Results

Sub-Matrix: MARINE WATER				Sample ID	R11-R3	----	----	----	----
				Sampling date / time	04-Jan-2023	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2300346-003	--------	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		4.5	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.340	----	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.469	----	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.80	----	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.10	----	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.036	----	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	----	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		8	----	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	----	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		26	----	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		3.5	----	----	----	----
EG: Metals and Major Cations - Total									
EG029: Cadmium	7440-43-9	0.1	µg/L		<0.1	----	----	----	----
EG029: Chromium	7440-47-3	1	µg/L		<1	----	----	----	----
EG029: Copper	7440-50-8	1	µg/L		1	----	----	----	----
EG029: Lead	7439-92-1	1	µg/L		<1	----	----	----	----
EG029: Zinc	7440-66-6	10	µg/L		<10	----	----	----	----
EG029: Aluminium	7429-90-5	10	µg/L		40	----	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		1600	----	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		4600	----	----	----	----

Sub-Matrix: WATER				Sample ID	R11-R1	R11-R2	R11-R1 (replicate)	----	----
				Sampling date / time	04-Jan-2023	04-Jan-2023	04-Jan-2023	----	----
Compound	CAS Number	LOR	Unit		HK2300346-001	HK2300346-002	HK2300346-004	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		67.5	24.2	48.6	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.085	0.039	0.065	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.128	0.216	0.128	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.17	0.07	0.19	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.03	0.02	0.03	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.016	0.013	0.019	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
EG: Metals and Major Cations									
EG020: Cadmium	7440-43-9	0.1	µg/L		<0.1	0.4	<0.1	----	----
EG020: Chromium	7440-47-3	1.0	µg/L		<1.0	1.3	<1.0	----	----
EG020: Copper	7440-50-8	1.0	µg/L		1.8	4.2	1.9	----	----
EG020: Lead	7439-92-1	1.0	µg/L		5.3	6.0	4.2	----	----
EG020: Zinc	7440-66-6	10	µg/L		75	58	23	----	----
EG020: Aluminium	7429-90-5	10	µg/L		808	1040	692	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		4	4	5	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	<0.5	<0.5	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		20	14	21	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		1.6	0.7	1.6	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		31	53	1000	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		69	110	2000	----	----

Laboratory Duplicate (DUP) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4801852)								
HK2251751-001	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	<1.0	<1.0	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803703)								
HK2300347-002	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.010	0.012	20.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803796)								
HK2251735-001	Anonymous	EK067P: Total Phosphorus as P	----	0.01	mg/L	2.21	2.24	1.5
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803798)								
HK2300377-001	Anonymous	EK067P: Total Phosphorus as P	----	0.01	mg/L	0.13	0.11	14.3
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)								
HK2300346-001	R11-R1	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.085	0.085	0.0
EG: Metals and Major Cations (QC Lot: 4802003)								
HK2300346-002	R11-R2	EG020: Zinc	7440-66-6	1	µg/L	58	65	12.3
EP: Aggregate Organics (QC Lot: 4807548)								
HK2251788-006	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0
EP: Aggregate Organics (QC Lot: 4809424)								
HK2300232-001	Anonymous	EP026: Chemical Oxygen Demand	----	2	mg/L	806	815	1.2
EP: Aggregate Organics (QC Lot: 4813583)								
HK2251357-010	Anonymous	EP026: Chemical Oxygen Demand	----	2	mg/L	8	8	0.0
EG: Metals and Major Cations - Total (QC Lot: 4802003)								
HK2300346-002	R11-R2	EG020: Cadmium	7440-43-9	0.1	µg/L	0.4	0.5	0.0
		EG020: Chromium	7440-47-3	0.1	µg/L	1.3	1.5	13.2
		EG020: Lead	7439-92-1	0.1	µg/L	6.0	6.6	8.8
		EG020: Copper	7440-50-8	0.2	µg/L	4.2	4.8	11.6
		EG020: Aluminium	7429-90-5	5	µg/L	1040	1000	3.3

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4801852)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	10 mg/L	108	----	85.1	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803703)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.5 mg/L	99.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803796)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	95.3	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803798)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	97.7	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4809929)											
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L	<0.05	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	103	----	85.0	110	----	----
EG: Metals and Major Cations (QC Lot: 4802003)											
EG020: Zinc	7440-66-6	1	µg/L	<1	5 µg/L	111	----	88.7	115	----	----
EP: Aggregate Organics (QC Lot: 4801260)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	100	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 4807548)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	108	----	83.4	124	----	----
				<1	100 mg/L	107	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4809424)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	101	----	88.4	109	----	----
				----	200 mg/L	98.3	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4813583)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	101	----	88.4	109	----	----
				----	200 mg/L	99.6	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4818889)											
EP020: Oil & Grease	----	1	mg/L	<0.1	20 mg/L	91.5	----	79.0	105	----	----
EG: Metals and Major Cations - Total (QC Lot: 4801995)											
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	96.5	----	85.0	115	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4801852)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	10 mg/L	108	----	85.1	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803703)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.5 mg/L	99.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803796)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	95.3	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803798)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	97.7	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4809929)											
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L	<0.05	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	103	----	85.0	110	----	----
EG: Metals and Major Cations (QC Lot: 4802003)											
EG020: Zinc	7440-66-6	1	µg/L	<1	5 µg/L	111	----	88.7	115	----	----
EP: Aggregate Organics (QC Lot: 4801260)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	100	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 4807548)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	108	----	83.4	124	----	----
				<1	100 mg/L	107	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4809424)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	101	----	88.4	109	----	----
				----	200 mg/L	98.3	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4813583)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	101	----	88.4	109	----	----
				----	200 mg/L	99.6	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4818889)											
EP020: Oil & Grease	----	1	mg/L	<0.1	20 mg/L	91.5	----	79.0	105	----	----
EG: Metals and Major Cations - Total (QC Lot: 4801995)											
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	96.5	----	85.0	115	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4801995) - Continued											
EG029: Chromium	7440-47-3	1	µg/L	<1	10 µg/L	94.0	----	85.0	115	----	----
EG029: Copper	7440-50-8	1	µg/L	<1	10 µg/L	95.6	----	85.0	115	----	----
EG029: Lead	7439-92-1	1	µg/L	<1	10 µg/L	98.2	----	85.0	115	----	----
EG029: Zinc	7440-66-6	10	µg/L	<10	10 µg/L	95.0	----	85.0	115	----	----
EG029: Aluminium	7429-90-5	10	µg/L	<10	10 µg/L	87.3	----	85.0	115	----	----
EG: Metals and Major Cations - Total (QC Lot: 4802003)											
EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	5 µg/L	97.7	----	85.0	115	----	----
EG020: Chromium	7440-47-3	0.1	µg/L	<0.1	5 µg/L	108	----	85.3	114	----	----
EG020: Copper	7440-50-8	0.2	µg/L	<0.2	5 µg/L	94.5	----	86.3	115	----	----
EG020: Lead	7439-92-1	0.1	µg/L	<0.1	5 µg/L	92.3	----	85.0	115	----	----
EG020: Aluminium	7429-90-5	5	µg/L	<5	5 µg/L	97.4	----	85.0	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803703)										
HK2300347-002	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	94.2	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803796)										
HK2251735-001	Anonymous	EK067P: Total Phosphorus as P	----	5 mg/L	98.6	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4803798)										
HK2300377-001	Anonymous	EK067P: Total Phosphorus as P	----	0.5 mg/L	96.9	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)										
HK2300346-001	R11-R1	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	104	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 4802003)										
HK2300346-001	R11-R1	EG020: Zinc	7440-66-6	5 µg/L	# Not Determined	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4807548)										
HK2251788-006	Anonymous	EP005: Total Organic Carbon	----	5 mg/L	102	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4809424)										
HK2301024-014	Anonymous	EP026: Chemical Oxygen Demand	----	400 mg/L	101	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4813583)										
HK2251357-009	Anonymous	EP026: Chemical Oxygen Demand	----	20 mg/L	105	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4801995)										
HK2300346-003	R11-R3	EG029: Cadmium	7440-43-9	10 µg/L	98.5	----	75.0	125	----	----
		EG029: Chromium	7440-47-3	10 µg/L	95.6	----	75.0	120	----	----
		EG029: Copper	7440-50-8	10 µg/L	97.1	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	95.8	----	75.0	125	----	----
		EG029: Zinc	7440-66-6	10 µg/L	90.6	----	75.0	125	----	----
		EG029: Aluminium	7429-90-5	10 µg/L	87.4	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4802003)										
HK2300346-001	R11-R1	EG020: Cadmium	7440-43-9	5 µg/L	101	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 µg/L	109	----	75.0	125	----	----

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4802003) - Continued										
HK2300346-001	R11-R1	EG020: Copper	7440-50-8	5 µg/L	100.0	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 µg/L	85.7	----	75.0	125	----	----
		EG020: Aluminium	7429-90-5	5 µg/L	# Not Determined	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 9
Contact	: EDWARD LEE	Contact	: Richard Fung	Work Order	: HK2300994
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION			Date Samples Received	: 06-Jan-2023
Order number	: HY/2022/09/WQM/01	Quote number	: HKE/1667/2022_V3	Issue Date	: 20-Jan-2023
C-O-C number	: ----			No. of samples received	: 4
Site	: WATER QUALITY MONITORING AT 3 LOCATIONS			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV, Kwai Tsing

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 06-Jan-2023 to 20-Jan-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2300994

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Microbiological sample(s) was/ were collected in 250mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 15:05.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EP005 - Due to matrix interference, sample #3 was diluted prior to Total Organic Carbon analysis, LOR has been adjusted accordingly.

EP026 - Due to high chloride content, sample #3 was diluted prior to Chemical Oxygen Demand analysis, LOR has been adjusted accordingly.

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EK061P - The accredited LOR of Total Kjeldahl Nitrogen is 0.1mg/L. Results reported below 0.1mg/L and the decimal value of the results were for reference only.

EK062P - The accredited LOR of Total Nitrogen is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EK071K - The accredited LOR of Reactive Phosphorus is 0.01mg/L. Results reported below LOR and with decimal value of the results are for reference only.

EK085 - The accredited LOR of Total Sulphide is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EP020 - The accredited LOR of Oil and Grease is 2mg/L. Results reported below LOR and with decimal value are for reference only.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below LOR and with decimal value are for reference only.

Water sample(s) digested by in-house method E-3005 prior to the determination of total metals. The in-house method is developed based on USEPA method 3005.

EA025 - The accredited LOR of Total Suspended Solids is 0.5mg/L. Results below this LOR are for reference only.

Analytical Results

Sub-Matrix: MARINE WATER				Sample ID	R11-R3	----	----	----	----
				Sampling date / time	06-Jan-2023	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2300994-003	--------	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		8.0	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.145	----	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.202	----	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.59	----	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.09	----	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.051	----	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	----	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		<5	----	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		0.7	----	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		<20	----	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		1.4	----	----	----	----
EG: Metals and Major Cations - Total									
EG029: Cadmium	7440-43-9	0.1	µg/L		<0.1	----	----	----	----
EG029: Chromium	7440-47-3	1	µg/L		2	----	----	----	----
EG029: Copper	7440-50-8	1	µg/L		2	----	----	----	----
EG029: Lead	7439-92-1	1	µg/L		<1	----	----	----	----
EG029: Zinc	7440-66-6	10	µg/L		272	----	----	----	----
EG029: Aluminium	7429-90-5	10	µg/L		89	----	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		180	----	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		490	----	----	----	----

Sub-Matrix: WATER				Sample ID	R11-R1	R11-R2	R11-R2 (replicate)	----	----
				Sampling date / time	06-Jan-2023	06-Jan-2023	06-Jan-2023	----	----
Compound	CAS Number	LOR	Unit		HK2300994-001	HK2300994-002	HK2300994-004	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		126	19.8	29.3	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.216	0.050	0.030	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.129	0.157	0.166	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.85	0.26	0.31	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.43	0.08	0.09	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.026	0.016	0.014	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
EG: Metals and Major Cations									
EG020: Cadmium	7440-43-9	0.1	µg/L		0.1	0.2	<0.1	----	----
EG020: Chromium	7440-47-3	1.0	µg/L		<1.0	<1.0	<1.0	----	----
EG020: Copper	7440-50-8	1.0	µg/L		2.6	3.4	2.8	----	----
EG020: Lead	7439-92-1	1.0	µg/L		8.3	4.2	2.9	----	----
EG020: Zinc	7440-66-6	10	µg/L		30	29	89	----	----
EG020: Aluminium	7429-90-5	10	µg/L		1060	614	415	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		6	4	6	----	----
EP020: Oil & Grease	----	0.5	mg/L		0.6	0.7	0.8	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		29	10	9	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		2.3	1.0	1.0	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		NOT DETECTED	10	8	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		NOT DETECTED	14	20	----	----

Laboratory Duplicate (DUP) Report

Matrix: WATER

				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4807453)								
HK2300992-001	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	2.8	2.5	8.5
HK2301017-004	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	63.0	62.6	0.6
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4804923)								
HK2300994-001	R11-R1	EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.026	0.028	7.7
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4808526)								
HK2300592-001	Anonymous	EK067P: Total Phosphorus as P	----	0.01	mg/L	3.33	3.32	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)								
HK2300346-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.085	0.085	0.0
EG: Metals and Major Cations (QC Lot: 4805848)								
HK2300992-002	Anonymous	EG020: Zinc	7440-66-6	1	µg/L	<10	<10	0.0
EP: Aggregate Organics (QC Lot: 4820255)								
HK2300994-003	R11-R3	EP005: Total Organic Carbon	----	1	mg/L	<5	<5	0.0
EP: Aggregate Organics (QC Lot: 4821183)								
HK2300992-002	Anonymous	EP026: Chemical Oxygen Demand	----	2	mg/L	22	22	0.0
EP: Aggregate Organics (QC Lot: 4822778)								
HK2301222-002	Anonymous	EP026: Chemical Oxygen Demand	----	2	mg/L	21	21	0.0
EP: Aggregate Organics (QC Lot: 4823931)								
HK2301062-002	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	137	138	0.0
EG: Metals and Major Cations - Total (QC Lot: 4805848)								
HK2300992-002	Anonymous	EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	<0.1	0.0
		EG020: Chromium	7440-47-3	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Lead	7439-92-1	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Copper	7440-50-8	0.2	µg/L	2.7	2.4	10.6
		EG020: Aluminium	7429-90-5	5	µg/L	16	18	11.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4807453)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	10 mg/L	104	----	85.1	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4804923)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.5 mg/L	98.8	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4808526)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	97.3	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4809929)											
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L	<0.05	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	103	----	85.0	110	----	----
EG: Metals and Major Cations (QC Lot: 4805848)											
EG020: Zinc	7440-66-6	1	µg/L	<1	5 µg/L	112	----	88.7	115	----	----
EP: Aggregate Organics (QC Lot: 4804799)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	87.0	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 4820255)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	94.2	----	83.4	124	----	----
				<1	100 mg/L	98.9	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4821183)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	105	----	88.4	109	----	----
				----	200 mg/L	100	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4822028)											
EP020: Oil & Grease	----	1	mg/L	<0.1	20 mg/L	98.0	----	79.0	105	----	----
EP: Aggregate Organics (QC Lot: 4822778)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	100	----	88.4	109	----	----
				----	200 mg/L	100	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4823931)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	97.8	----	83.4	124	----	----
				<1	100 mg/L	102	----	87.8	119	----	----
EG: Metals and Major Cations - Total (QC Lot: 4805848)											

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4805848) - Continued											
EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	5 µg/L	108	----	85.0	115	----	----
EG020: Chromium	7440-47-3	0.1	µg/L	<0.1	5 µg/L	107	----	85.3	114	----	----
EG020: Copper	7440-50-8	0.2	µg/L	<0.2	5 µg/L	97.8	----	86.3	115	----	----
EG020: Lead	7439-92-1	0.1	µg/L	<0.1	5 µg/L	106	----	85.0	115	----	----
EG020: Aluminium	7429-90-5	5	µg/L	<5	5 µg/L	94.9	----	85.0	115	----	----
EG: Metals and Major Cations - Total (QC Lot: 4805849)											
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	100	----	85.0	115	----	----
EG029: Chromium	7440-47-3	1	µg/L	<1	10 µg/L	93.2	----	85.0	115	----	----
EG029: Copper	7440-50-8	1	µg/L	<1	10 µg/L	99.6	----	85.0	115	----	----
EG029: Lead	7439-92-1	1	µg/L	<1	10 µg/L	99.1	----	85.0	115	----	----
EG029: Zinc	7440-66-6	10	µg/L	<10	10 µg/L	97.0	----	85.0	115	----	----
EG029: Aluminium	7429-90-5	10	µg/L	<10	10 µg/L	89.1	----	85.0	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4804923)										
HK2300994-001	R11-R1	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	99.6	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4808526)										
HK2300592-001	Anonymous	EK067P: Total Phosphorus as P	----	5 mg/L	99.7	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)										
HK2300346-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	104	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 4805848)										
HK2300992-001	Anonymous	EG020: Zinc	7440-66-6	5 µg/L	# Not Determined	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4820255)										
HK2300994-003	R11-R3	EP005: Total Organic Carbon	----	25 mg/L	84.2	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4821183)										
HK2300992-001	Anonymous	EP026: Chemical Oxygen Demand	----	20 mg/L	99.0	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4822778)										
HK2301222-001	Anonymous	EP026: Chemical Oxygen Demand	----	20 mg/L	98.5	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4823931)										
HK2301062-002	Anonymous	EP005: Total Organic Carbon	----	25 mg/L	# Not Determined	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4805848)										
HK2300992-001	Anonymous	EG020: Cadmium	7440-43-9	5 µg/L	104	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 µg/L	99.4	----	75.0	125	----	----
		EG020: Copper	7440-50-8	5 µg/L	111	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 µg/L	107	----	75.0	125	----	----
		EG020: Aluminium	7429-90-5	5 µg/L	# Not Determined	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4805849)										
HK2300994-003	R11-R3	EG029: Cadmium	7440-43-9	10 µg/L	98.6	----	75.0	125	----	----

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4805849) - Continued										
HK2300994-003	R11-R3	EG029: Chromium	7440-47-3	10 µg/L	80.8	----	75.0	120	----	----
		EG029: Copper	7440-50-8	10 µg/L	98.0	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	97.7	----	75.0	125	----	----
		EG029: Zinc	7440-66-6	10 µg/L	# Not Determined	----	75.0	125	----	----
		EG029: Aluminium	7429-90-5	10 µg/L	# Not Determined	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 9
Contact	: EDWARD LEE	Contact	: Richard Fung	Work Order	: HK2301241
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION			Date Samples Received	: 09-Jan-2023
Order number	: HY/2022/09/WQM/01	Quote number	: HKE/1667/2022_V3	Issue Date	: 26-Jan-2023
C-O-C number	: ----			No. of samples received	: 4
Site	: WATER QUALITY MONITORING AT 3 LOCATIONS			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV, Kwai Tsing

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General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 09-Jan-2023 to 26-Jan-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2301241

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Microbiological sample(s) was/ were collected in 250mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 15:40.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EP026 - Due to high chloride content, samples #3-4 were diluted prior to Chemical Oxygen Demand analysis, LOR has been adjusted accordingly.

EP005 - Due to matrix interference, samples #3,4 were diluted prior to Total Organic Carbon, LOR has been adjusted accordingly.

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EK061P - The accredited LOR of Total Kjeldahl Nitrogen is 0.1mg/L. Results reported below 0.1mg/L and the decimal value of the results were for reference only.

EK062P - The accredited LOR of Total Nitrogen is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EK071K - The accredited LOR of Reactive Phosphorus is 0.01mg/L. Results reported below LOR and with decimal value of the results are for reference only.

EK085 - The accredited LOR of Total Sulphide is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EP020 - The accredited LOR of Oil and Grease is 2mg/L. Results reported below LOR and with decimal value are for reference only.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below LOR and with decimal value are for reference only.

Water sample(s) digested by in-house method E-3005 prior to the determination of total metals. The in-house method is developed based on USEPA method 3005.

EA025 - The accredited LOR of Total Suspended Solids is 0.5mg/L. Results below this LOR are for reference only.

Analytical Results

Sub-Matrix: MARINE WATER				Sample ID	R11-R3	R11-R3 (replicate)	----	----	----
				Sampling date / time	09-Jan-2023	09-Jan-2023	----	----	----
Compound	CAS Number	LOR	Unit		HK2301241-003	HK2301241-004	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		6.8	5.3	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.146	0.144	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.259	0.253	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.45	0.51	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.12	0.13	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.083	0.083	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		<5	<5	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	<0.5	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		<20	<20	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		0.7	0.8	----	----	----
EG: Metals and Major Cations - Total									
EG029: Cadmium	7440-43-9	0.1	µg/L		<0.1	<0.1	----	----	----
EG029: Chromium	7440-47-3	1	µg/L		<1	<1	----	----	----
EG029: Copper	7440-50-8	1	µg/L		3	2	----	----	----
EG029: Lead	7439-92-1	1	µg/L		<1	<1	----	----	----
EG029: Zinc	7440-66-6	10	µg/L		16	94	----	----	----
EG029: Aluminium	7429-90-5	10	µg/L		83	84	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		53	78	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		100	140	----	----	----

Sub-Matrix: WATER				Sample ID	R11-R1	R11-R2	----	----	----
				Sampling date / time	09-Jan-2023	09-Jan-2023	----	----	----
Compound	CAS Number	LOR	Unit		HK2301241-001	HK2301241-002	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		87.8	12.4	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.188	0.099	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.173	0.230	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.71	0.26	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.32	0.06	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.021	0.015	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	----	----	----
EG: Metals and Major Cations									
EG020: Cadmium	7440-43-9	0.1	µg/L		0.2	0.2	----	----	----
EG020: Chromium	7440-47-3	1.0	µg/L		1.1	<1.0	----	----	----
EG020: Copper	7440-50-8	1.0	µg/L		2.6	2.8	----	----	----
EG020: Lead	7439-92-1	1.0	µg/L		12.5	1.7	----	----	----
EG020: Zinc	7440-66-6	10	µg/L		91	34	----	----	----
EG020: Aluminium	7429-90-5	10	µg/L		1630	245	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		5	4	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	<0.5	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		38	9	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		1.9	0.8	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		34	16	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		57	20	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4807453)								
HK2300992-001	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	2.8	2.5	8.5
HK2301017-004	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	63.0	62.6	0.6
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4808528)								
HK2301155-001	Anonymous	EK067P: Total Phosphorus as P	----	0.01	mg/L	2.60	2.55	2.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4809575)								
HK2301222-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.008	0.008	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)								
HK2300346-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.085	0.085	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813687)								
HK2301759-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	34.2	33.7	1.6
EG: Metals and Major Cations (QC Lot: 4807557)								
HK2301222-002	Anonymous	EG020: Zinc	7440-66-6	1	µg/L	75	70	6.4
EP: Aggregate Organics (QC Lot: 4822778)								
HK2301222-002	Anonymous	EP026: Chemical Oxygen Demand	----	2	mg/L	21	21	0.0
EP: Aggregate Organics (QC Lot: 4823932)								
HK2302278-005	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0
EG: Metals and Major Cations - Total (QC Lot: 4807557)								
HK2301222-002	Anonymous	EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	<0.1	0.0
		EG020: Chromium	7440-47-3	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Lead	7439-92-1	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Copper	7440-50-8	0.2	µg/L	3.1	2.9	5.7
		EG020: Aluminium	7429-90-5	5	µg/L	27	26	4.3
EG: Metals and Major Cations - Total (QC Lot: 4807558)								
HK2301241-004	R11-R3 (replicate)	EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	<0.1	0.0
		EG029: Chromium	7440-47-3	1	µg/L	<1	<1	0.0
		EG029: Copper	7440-50-8	1	µg/L	2	2	0.0
		EG029: Lead	7439-92-1	1	µg/L	<1	<1	0.0
		EG029: Zinc	7440-66-6	10	µg/L	94	94	0.0
		EG029: Aluminium	7429-90-5	10	µg/L	84	79	6.6

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4807453)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	10 mg/L	104	----	85.1	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4808528)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	98.8	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4809575)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.5 mg/L	96.3	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4809929)											
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L	<0.05	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	103	----	85.0	110	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813687)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	108	----	85.0	110	----	----
EG: Metals and Major Cations (QC Lot: 4807557)											
EG020: Zinc	7440-66-6	1	µg/L	<1	5 µg/L	112	----	88.7	115	----	----
EP: Aggregate Organics (QC Lot: 4806586)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	87.3	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 4822778)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	100	----	88.4	109	----	----
				----	200 mg/L	100	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4823932)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	98.9	----	83.4	124	----	----
				<1	100 mg/L	99.9	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4824841)											
EP020: Oil & Grease	----	1	mg/L	<0.1	20 mg/L	90.9	----	79.0	105	----	----
EG: Metals and Major Cations - Total (QC Lot: 4807557)											
EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	5 µg/L	103	----	85.0	115	----	----
EG020: Chromium	7440-47-3	0.1	µg/L	<0.1	5 µg/L	107	----	85.3	114	----	----
EG020: Copper	7440-50-8	0.2	µg/L	<0.2	5 µg/L	105	----	86.3	115	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4807557) - Continued											
EG020: Lead	7439-92-1	0.1	µg/L	<0.1	5 µg/L	108	----	85.0	115	----	----
EG020: Aluminium	7429-90-5	5	µg/L	<5	5 µg/L	112	----	85.0	115	----	----
EG: Metals and Major Cations - Total (QC Lot: 4807558)											
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	97.2	----	85.0	115	----	----
EG029: Chromium	7440-47-3	1	µg/L	<1	10 µg/L	99.4	----	85.0	115	----	----
EG029: Copper	7440-50-8	1	µg/L	<1	10 µg/L	102	----	85.0	115	----	----
EG029: Lead	7439-92-1	1	µg/L	<1	10 µg/L	100	----	85.0	115	----	----
EG029: Zinc	7440-66-6	10	µg/L	<10	10 µg/L	114	----	85.0	115	----	----
EG029: Aluminium	7429-90-5	10	µg/L	<10	10 µg/L	89.9	----	85.0	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4808528)										
HK2301155-001	Anonymous	EK067P: Total Phosphorus as P	----	5 mg/L	99.9	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4809575)										
HK2301222-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	93.9	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813686)										
HK2300346-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.5 mg/L	104	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813687)										
HK2301759-001	Anonymous	EK055A: Ammonia as N	7664-41-7	50 mg/L	100	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 4807557)										
HK2301222-001	Anonymous	EG020: Zinc	7440-66-6	5 µg/L	# Not Determined	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4822778)										
HK2301222-001	Anonymous	EP026: Chemical Oxygen Demand	----	20 mg/L	98.5	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4823932)										
HK2302278-005	Anonymous	EP005: Total Organic Carbon	----	5 mg/L	102	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4807557)										
HK2301222-001	Anonymous	EG020: Cadmium	7440-43-9	5 µg/L	103	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 µg/L	97.3	----	75.0	125	----	----
		EG020: Copper	7440-50-8	5 µg/L	95.8	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 µg/L	106	----	75.0	125	----	----
		EG020: Aluminium	7429-90-5	5 µg/L	# Not Determined	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4807558)										
HK2301241-003	R11-R3	EG029: Cadmium	7440-43-9	10 µg/L	97.1	----	75.0	125	----	----
		EG029: Chromium	7440-47-3	10 µg/L	96.0	----	75.0	120	----	----
		EG029: Copper	7440-50-8	10 µg/L	108	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	101	----	75.0	125	----	----

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4807558) - Continued										
HK2301241-003	R11-R3	EG029: Zinc	7440-66-6	10 µg/L	113	----	75.0	125	----	----
		EG029: Aluminium	7429-90-5	10 µg/L	# Not Determined	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 9
Contact	: EDWARD LEE	Contact	: Richard Fung	Work Order	: HK2301763
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION			Date Samples Received	: 11-Jan-2023
Order number	: HY/2022/09/WQM/01	Quote number	: HKE/1667/2022_V3	Issue Date	: 30-Jan-2023
C-O-C number	: ----			No. of samples received	: 4
Site	: WATER QUALITY MONITORING AT 3 LOCATIONS			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV, Kwai Tsing

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 11-Jan-2023 to 30-Jan-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2301763

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Microbiological sample(s) was/ were collected in 250mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 15:35.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EP026 - Due to high chloride content, sample #3 was diluted prior to Chemical Oxygen Demand analysis, LOR has been adjusted accordingly.

EP005 - Due to matrix interference, sample #3 was diluted prior to Total Organic Carbon analysis, LOR has been adjusted accordingly.

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EK061P - The accredited LOR of Total Kjeldahl Nitrogen is 0.1mg/L. Results reported below 0.1mg/L and the decimal value of the results were for reference only.

EK062P - The accredited LOR of Total Nitrogen is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EK071K - The accredited LOR of Reactive Phosphorus is 0.01mg/L. Results reported below LOR and with decimal value of the results are for reference only.

EK085 - The accredited LOR of Total Sulphide is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EP020 - The accredited LOR of Oil and Grease is 2mg/L. Results reported below LOR and with decimal value are for reference only.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below LOR and with decimal value are for reference only.

Water sample(s) digested by in-house method E-3005 prior to the determination of total metals. The in-house method is developed based on USEPA method 3005.

EA025 - The accredited LOR of Total Suspended Solids is 0.5mg/L. Results below this LOR are for reference only.

Analytical Results

Sub-Matrix: MARINE WATER				Sample ID	R11-R3	----	----	----	----
				Sampling date / time	11-Jan-2023	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2301763-003	--------	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		4.5	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.168	----	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.389	----	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.38	----	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.10	----	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.069	----	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	----	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		<5	----	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	----	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		<20	----	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		1.0	----	----	----	----
EG: Metals and Major Cations - Total									
EG029: Cadmium	7440-43-9	0.1	µg/L		<0.1	----	----	----	----
EG029: Chromium	7440-47-3	1	µg/L		<1	----	----	----	----
EG029: Copper	7440-50-8	1	µg/L		1	----	----	----	----
EG029: Lead	7439-92-1	1	µg/L		<1	----	----	----	----
EG029: Zinc	7440-66-6	10	µg/L		273	----	----	----	----
EG029: Aluminium	7429-90-5	10	µg/L		51	----	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		80	----	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		86	----	----	----	----

Sub-Matrix: WATER				Sample ID	R11-R1	R11-R2	R11-R1 (replicate)	----	----
				Sampling date / time	11-Jan-2023	11-Jan-2023	11-Jan-2023	----	----
Compound	CAS Number	LOR	Unit		HK2301763-001	HK2301763-002	HK2301763-004	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		50.6	4.1	68.6	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.017	0.051	0.014	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.228	0.556	0.219	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.47	0.27	0.62	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.21	0.04	0.28	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.024	0.026	0.021	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
EG: Metals and Major Cations									
EG020: Cadmium	7440-43-9	0.1	µg/L		<0.1	<0.1	0.2	----	----
EG020: Chromium	7440-47-3	1.0	µg/L		<1.0	<1.0	1.1	----	----
EG020: Copper	7440-50-8	1.0	µg/L		2.3	3.2	4.4	----	----
EG020: Lead	7439-92-1	1.0	µg/L		5.7	1.4	11.8	----	----
EG020: Zinc	7440-66-6	10	µg/L		26	38	50	----	----
EG020: Aluminium	7429-90-5	10	µg/L		595	103	1170	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		7	5	6	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	<0.5	<0.5	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		21	10	22	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		1.5	0.8	1.5	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		570	590	570	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		610	590	620	----	----

Laboratory Duplicate (DUP) Report

Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4813457)								
HK2301763-001	R11-R1	EA025: Suspended Solids (SS)	----	0.5	mg/L	50.6	51.0	0.7
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4812110)								
HK2301763-001	R11-R1	EK067P: Total Phosphorus as P	----	0.01	mg/L	0.21	0.22	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813682)								
HK2301759-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.008	0.008	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813687)								
HK2301759-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	34.2	33.7	1.6
EG: Metals and Major Cations (QC Lot: 4811489)								
HK2301759-002	Anonymous	EG020: Zinc	7440-66-6	1	µg/L	12	11	0.0
EP: Aggregate Organics (QC Lot: 4822778)								
HK2301222-002	Anonymous	EP026: Chemical Oxygen Demand	----	2	mg/L	21	21	0.0
EP: Aggregate Organics (QC Lot: 4825270)								
HK2301763-003	R11-R3	EP005: Total Organic Carbon	----	1	mg/L	<5	<5	0.0
EG: Metals and Major Cations - Total (QC Lot: 4811489)								
HK2301759-002	Anonymous	EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	<0.1	0.0
		EG020: Chromium	7440-47-3	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Lead	7439-92-1	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Copper	7440-50-8	0.2	µg/L	2.2	2.2	0.0
		EG020: Aluminium	7429-90-5	5	µg/L	38	32	17.6

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER		Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4813457)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	10 mg/L	101	----	85.1	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4812110)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	96.3	----	94.9	102	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813682)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.5 mg/L	101	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813687)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	108	----	85.0	110	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4819423)											
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L	<0.05	----	----	----	----	----	----	----
EG: Metals and Major Cations (QC Lot: 4811489)											
EG020: Zinc	7440-66-6	1	µg/L	<1	5 µg/L	97.9	----	88.7	115	----	----
EP: Aggregate Organics (QC Lot: 4810285)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	105	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 4822778)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	100	----	88.4	109	----	----
				----	200 mg/L	100	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4825270)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	93.2	----	83.4	124	----	----
				<1	100 mg/L	113	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4826412)											
EP020: Oil & Grease	----	1	mg/L	<0.1	20 mg/L	93.4	----	79.0	105	----	----
EG: Metals and Major Cations - Total (QC Lot: 4811489)											
EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	5 µg/L	98.8	----	85.0	115	----	----
EG020: Chromium	7440-47-3	0.1	µg/L	<0.1	5 µg/L	96.0	----	85.3	114	----	----
EG020: Copper	7440-50-8	0.2	µg/L	<0.2	5 µg/L	97.4	----	86.3	115	----	----
EG020: Lead	7439-92-1	0.1	µg/L	<0.1	5 µg/L	92.6	----	85.0	115	----	----
EG020: Aluminium	7429-90-5	5	µg/L	<5	5 µg/L	103	----	85.0	115	----	----
EG: Metals and Major Cations - Total (QC Lot: 4811490)											
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	99.4	----	85.0	115	----	----
EG029: Chromium	7440-47-3	1	µg/L	<1	10 µg/L	103	----	85.0	115	----	----
EG029: Copper	7440-50-8	1	µg/L	<1	10 µg/L	109	----	85.0	115	----	----
EG029: Lead	7439-92-1	1	µg/L	<1	10 µg/L	101	----	85.0	115	----	----
EG029: Zinc	7440-66-6	10	µg/L	<10	10 µg/L	113	----	85.0	115	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4811490) - Continued											
EG029: Aluminium	7429-90-5	10	µg/L	<10	10 µg/L	88.0	----	85.0	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4812110)										
HK2301763-001	R11-R1	EK067P: Total Phosphorus as P	----	0.5 mg/L	98.1	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813682)										
HK2301759-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	102	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4813687)										
HK2301759-001	Anonymous	EK055A: Ammonia as N	7664-41-7	50 mg/L	100	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 4811489)										
HK2301759-001	Anonymous	EG020: Zinc	7440-66-6	5 µg/L	75.5	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4822778)										
HK2301222-001	Anonymous	EP026: Chemical Oxygen Demand	----	20 mg/L	98.5	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4825270)										
HK2301763-003	R11-R3	EP005: Total Organic Carbon	----	25 mg/L	99.3	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4811489)										
HK2301759-001	Anonymous	EG020: Cadmium	7440-43-9	5 µg/L	97.4	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 µg/L	94.5	----	75.0	125	----	----
		EG020: Copper	7440-50-8	5 µg/L	105	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 µg/L	94.3	----	75.0	125	----	----
		EG020: Aluminium	7429-90-5	5 µg/L	# Not Determined	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4811490)										
HK2301763-003	R11-R3	EG029: Cadmium	7440-43-9	10 µg/L	96.6	----	75.0	125	----	----
		EG029: Chromium	7440-47-3	10 µg/L	106	----	75.0	120	----	----
		EG029: Copper	7440-50-8	10 µg/L	121	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	104	----	75.0	125	----	----
		EG029: Zinc	7440-66-6	10 µg/L	# Not Determined	----	75.0	125	----	----
		EG029: Aluminium	7429-90-5	10 µg/L	# Not Determined	----	75.0	125	----	----

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4811490) - Continued										

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ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 9
Contact	: EDWARD LEE	Contact	: Richard Fung	Work Order	: HK2302189
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION			Date Samples Received	: 13-Jan-2023
Order number	: HY/2022/09/WQM/01	Quote number	: HKE/1667/2022_V3	Issue Date	: 01-Feb-2023
C-O-C number	: ----			No. of samples received	: 4
Site	: WATER QUALITY MONITORING AT 3 LOCATIONS			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV, Kwai Tsing

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General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 13-Jan-2023 to 01-Feb-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2302189

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Microbiological sample(s) was/ were collected in 250mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 15:35.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EP026 - Due to high chloride content, sample #3 was diluted prior to Chemical Oxygen Demand analysis, LOR has been adjusted accordingly.

EP005 - Due to matrix interference, sample #3 was diluted prior to Total Organic Carbon analysis, LOR has been adjusted accordingly.

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EK061P - The accredited LOR of Total Kjeldahl Nitrogen is 0.1mg/L. Results reported below 0.1mg/L and the decimal value of the results were for reference only.

EK062P - The accredited LOR of Total Nitrogen is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EK071K - The accredited LOR of Reactive Phosphorus is 0.01mg/L. Results reported below LOR and with decimal value of the results are for reference only.

EK085 - The accredited LOR of Total Sulphide is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EP020 - The accredited LOR of Oil and Grease is 2mg/L. Results reported below LOR and with decimal value are for reference only.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below LOR and with decimal value are for reference only.

Water sample(s) digested by in-house method E-3005 prior to the determination of total metals. The in-house method is developed based on USEPA method 3005.

EA025 - The accredited LOR of Total Suspended Solids is 0.5mg/L. Results below this LOR are for reference only.

Analytical Results

Sub-Matrix: MARINE WATER				Sample ID	R11-R3	----	----	----	----
				Sampling date / time	13-Jan-2023	----	----	----	----
Compound	CAS Number	LOR	Unit		HK2302189-003	--------	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		5.1	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.147	----	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.470	----	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.38	----	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.14	----	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.118	----	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	----	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		<5	----	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	----	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		<20	----	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		0.8	----	----	----	----
EG: Metals and Major Cations - Total									
EG029: Cadmium	7440-43-9	0.1	µg/L		<0.1	----	----	----	----
EG029: Chromium	7440-47-3	1	µg/L		<1	----	----	----	----
EG029: Copper	7440-50-8	1	µg/L		1	----	----	----	----
EG029: Lead	7439-92-1	1	µg/L		<1	----	----	----	----
EG029: Zinc	7440-66-6	10	µg/L		<10	----	----	----	----
EG029: Aluminium	7429-90-5	10	µg/L		54	----	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		73	----	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		78	----	----	----	----

Sub-Matrix: RIVER WATER				Sample ID	R11-R1	R11-R2	R11-R2 (replicate)	----	----
				Sampling date / time	13-Jan-2023	13-Jan-2023	13-Jan-2023	----	----
Compound	CAS Number	LOR	Unit		HK2302189-001	HK2302189-002	HK2302189-004	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		33.0	41.4	24.2	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.243	0.040	0.025	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.264	0.234	0.231	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.72	0.53	0.30	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.36	0.13	0.08	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.030	0.030	0.025	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
EG: Metals and Major Cations									
EG020: Cadmium	7440-43-9	0.1	µg/L		<0.1	0.1	0.2	----	----
EG020: Chromium	7440-47-3	1.0	µg/L		<1.0	<1.0	<1.0	----	----
EG020: Copper	7440-50-8	1.0	µg/L		2.2	3.3	3.6	----	----
EG020: Lead	7439-92-1	1.0	µg/L		7.7	2.6	3.4	----	----
EG020: Zinc	7440-66-6	10	µg/L		29	22	35	----	----
EG020: Aluminium	7429-90-5	10	µg/L		941	416	519	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		3	5	4	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	<0.5	<0.5	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		25	10	10	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		1.8	1.3	1.0	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		4100	150	140	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		4100	170	150	----	----

Laboratory Duplicate (DUP) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4816312)								
HK2302188-001	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	<0.5	0.0
HK2302219-005	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	2.8	3.2	14.1
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4816755)								
HK2302188-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.008	0.007	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4822120)								
HK2302224-001	Anonymous	EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4842731)								
HK2302188-002	Anonymous	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	39.2	38.7	1.2
EG: Metals and Major Cations (QC Lot: 4816416)								
HK2302188-002	Anonymous	EG020: Zinc	7440-66-6	1	µg/L	13	13	0.0
EP: Aggregate Organics (QC Lot: 4825270)								
HK2301763-003	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<5	<5	0.0
EP: Aggregate Organics (QC Lot: 4825271)								
HK2302278-006	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0
EP: Aggregate Organics (QC Lot: 4836026)								
HK2302189-002	R11-R2	EP026: Chemical Oxygen Demand	----	2	mg/L	10	10	0.0
EG: Metals and Major Cations - Total (QC Lot: 4816416)								
HK2302188-002	Anonymous	EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	<0.1	0.0
		EG020: Chromium	7440-47-3	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Lead	7439-92-1	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Copper	7440-50-8	0.2	µg/L	2.4	2.6	5.3
		EG020: Aluminium	7429-90-5	5	µg/L	16	16	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4816312)											

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4816312) - Continued											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	10 mg/L	92.0	----	85.1	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4816755)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.5 mg/L	99.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4819423)											
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L	<0.05	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4822120)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	95.6	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4842731)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	109	----	85.0	110	----	----
EG: Metals and Major Cations (QC Lot: 4816416)											
EG020: Zinc	7440-66-6	1	µg/L	<1	5 µg/L	100	----	88.7	115	----	----
EP: Aggregate Organics (QC Lot: 4814851)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	108	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 4825270)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	93.2	----	83.4	124	----	----
				<1	100 mg/L	113	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4825271)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	93.4	----	83.4	124	----	----
				<1	100 mg/L	98.4	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4836026)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	100	----	88.4	109	----	----
				----	200 mg/L	102	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4837291)											
EP020: Oil & Grease	----	1	mg/L	<0.1	20 mg/L	86.1	----	79.0	105	----	----
EG: Metals and Major Cations - Total (QC Lot: 4816416)											
EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	5 µg/L	97.8	----	85.0	115	----	----
EG020: Chromium	7440-47-3	0.1	µg/L	<0.1	5 µg/L	103	----	85.3	114	----	----
EG020: Copper	7440-50-8	0.2	µg/L	<0.2	5 µg/L	97.8	----	86.3	115	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4816416) - Continued											
EG020: Lead	7439-92-1	0.1	µg/L	<0.1	5 µg/L	98.4	----	85.0	115	----	----
EG020: Aluminium	7429-90-5	5	µg/L	<5	5 µg/L	98.9	----	85.0	115	----	----
EG: Metals and Major Cations - Total (QC Lot: 4816417)											
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	99.7	----	85.0	115	----	----
EG029: Chromium	7440-47-3	1	µg/L	<1	10 µg/L	112	----	85.0	115	----	----
EG029: Copper	7440-50-8	1	µg/L	<1	10 µg/L	102	----	85.0	115	----	----
EG029: Lead	7439-92-1	1	µg/L	<1	10 µg/L	100	----	85.0	115	----	----
EG029: Zinc	7440-66-6	10	µg/L	<10	10 µg/L	100	----	85.0	115	----	----
EG029: Aluminium	7429-90-5	10	µg/L	<10	10 µg/L	106	----	85.0	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4816755)										
HK2302188-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	96.0	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4822120)										
HK2302224-001	Anonymous	EK067P: Total Phosphorus as P	----	0.5 mg/L	96.7	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4842731)										
HK2302188-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.05 mg/L	# Not Determined	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 4816416)										
HK2302188-001	Anonymous	EG020: Zinc	7440-66-6	5 µg/L	83.2	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4825270)										
HK2301763-003	Anonymous	EP005: Total Organic Carbon	----	25 mg/L	99.3	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4825271)										
HK2302278-006	Anonymous	EP005: Total Organic Carbon	----	5 mg/L	99.6	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4836026)										
HK2302189-001	R11-R1	EP026: Chemical Oxygen Demand	----	20 mg/L	99.5	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4816416)										
HK2302188-001	Anonymous	EG020: Cadmium	7440-43-9	5 µg/L	92.1	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 µg/L	103	----	75.0	125	----	----
		EG020: Copper	7440-50-8	5 µg/L	91.1	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 µg/L	96.2	----	75.0	125	----	----
		EG020: Aluminium	7429-90-5	5 µg/L	87.6	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4816417)										
HK2302189-003	R11-R3	EG029: Cadmium	7440-43-9	10 µg/L	103	----	75.0	125	----	----
		EG029: Chromium	7440-47-3	10 µg/L	101	----	75.0	120	----	----
		EG029: Copper	7440-50-8	10 µg/L	99.9	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	98.0	----	75.0	125	----	----
		EG029: Zinc	7440-66-6	10 µg/L	95.7	----	75.0	125	----	----

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4816417) - Continued										
HK2302189-003	R11-R3	EG029: Aluminium	7429-90-5	10 µg/L	# Not Determined	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: HIGHWAYS DEPARTMENT	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 9
Contact	: EDWARD LEE	Contact	: Richard Fung	Work Order	: HK2302471
Address	: RM 10-01 TO 10-03, PENINSULA TOWER 538 CASTLE PEAK ROAD, KOWLOON, HONG KONG HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong Kwai Tsing Hong Kong		
E-mail	: Edward.Lee@arup.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: ----	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: ROUTE 11 (SECTION BETWEEN YUEN LONG AND NORTH LANTAU) AND OTHER MAJOR ROAD PROJECTS - GROUND INVESTIGATION			Date Samples Received	: 16-Jan-2023
Order number	: HY/2022/09/WQM/01	Quote number	: HKE/1667/2022_V3	Issue Date	: 02-Feb-2023
C-O-C number	: ----			No. of samples received	: 4
Site	: WATER QUALITY MONITORING AT 3 LOCATIONS			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	Position	Authorised results for
Fung Lim Chee, Richard	Managing Director	Inorganics, Kwai Tsing
Fung Lim Chee, Richard	Managing Director	Metals_ENV, Kwai Tsing
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV, Kwai Tsing

General Comments

This report supersedes any previous report(s) with the same work order number. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Testing period is from 16-Jan-2023 to 02-Feb-2023.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2302471

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.

Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.

Microbiological sample(s) was/ were collected in 250mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 15:30.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EP005 - Due to matrix interference, sample #2 was diluted prior to Total Organic Carbon analysis, LOR has been adjusted accordingly.

EK061P - Total Kjeldahl Nitrogen is the difference of Total Nitrogen and Total Oxidizable Nitrogen.

EK061P - The accredited LOR of Total Kjeldahl Nitrogen is 0.1mg/L. Results reported below 0.1mg/L and the decimal value of the results were for reference only.

EK062P - The accredited LOR of Total Nitrogen is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EK071K - The accredited LOR of Reactive Phosphorus is 0.01mg/L. Results reported below LOR and with decimal value of the results are for reference only.

EK085 - The accredited LOR of Total Sulphide is 0.1mg/L. Results reported below LOR and with decimal value are for reference only.

EP020 - The accredited LOR of Oil and Grease is 2mg/L. Results reported below LOR and with decimal value are for reference only.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below LOR and with decimal value are for reference only.

Water sample(s) digested by in-house method E-3005 prior to the determination of total metals. The in-house method is developed based on USEPA method 3005.

EA025 - The accredited LOR of Total Suspended Solids is 0.5mg/L. Results below this LOR are for reference only.

Analytical Results

Sub-Matrix: MARINE WATER

Compound	CAS Number	LOR	Unit	Sample ID	R11-R3	R11-R3 (replicate)	----	----	----
				Sampling date / time	16-Jan-2023	16-Jan-2023	----	----	----
					HK2302471-003	HK2302471-004	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		5.4	5.9	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.171	0.163	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.378	0.380	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.42	0.42	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.08	0.06	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.059	0.045	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		11	12	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	<0.5	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		19	13	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		1.1	0.9	----	----	----
EG: Metals and Major Cations - Total									
EG029: Cadmium	7440-43-9	0.1	µg/L		<0.1	<0.1	----	----	----
EG029: Chromium	7440-47-3	1	µg/L		<1	<1	----	----	----
EG029: Copper	7440-50-8	1	µg/L		1	1	----	----	----
EG029: Lead	7439-92-1	1	µg/L		<1	<1	----	----	----
EG029: Zinc	7440-66-6	10	µg/L		<10	144	----	----	----
EG029: Aluminium	7429-90-5	10	µg/L		102	89	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		34	36	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		52	56	----	----	----

Sub-Matrix: WATER				Sample ID	R11-R1	R11-R2	----	----	----
				Sampling date / time	16-Jan-2023	16-Jan-2023	----	----	----
Compound	CAS Number	LOR	Unit		HK2302471-001	HK2302471-002	--------	--------	--------
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		111	9.8	----	----	----
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.181	0.034	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.153	0.223	----	----	----
EK061P: Total Kjeldahl Nitrogen as N	----	0.05	mg/L		0.77	0.23	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.39	0.05	----	----	----
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L		0.023	0.014	----	----	----
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L		<0.05	<0.05	----	----	----
EG: Metals and Major Cations									
EG020: Cadmium	7440-43-9	0.1	µg/L		0.2	<0.1	----	----	----
EG020: Chromium	7440-47-3	1.0	µg/L		1.1	<1.0	----	----	----
EG020: Copper	7440-50-8	1.0	µg/L		2.7	2.4	----	----	----
EG020: Lead	7439-92-1	1.0	µg/L		11.0	1.4	----	----	----
EG020: Zinc	7440-66-6	10	µg/L		128	18	----	----	----
EG020: Aluminium	7429-90-5	10	µg/L		1610	212	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	1	mg/L		5	<5	----	----	----
EP020: Oil & Grease	----	0.5	mg/L		<0.5	<0.5	----	----	----
EP026: Chemical Oxygen Demand	----	2	mg/L		38	10	----	----	----
EP030: Biochemical Oxygen Demand	----	0.1	mg/L		2.4	1.2	----	----	----
EM: Microbiological Testing									
EM019: Escherichia coli	----	1	CFU/100mL		2500	45	----	----	----
EM022: Faecal Coliforms	----	1	CFU/100mL		3400	65	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 4817885)								
HK2302462-001	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	6.2	6.5	4.7
HK2302468-001	Anonymous	EA025: Suspended Solids (SS)	----	0.5	mg/L	<1.0	<1.0	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4818979)								
HK2302462-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.004	0.004	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4822122)								
HK2302588-001	Anonymous	EK067P: Total Phosphorus as P	----	0.01	mg/L	3.36	3.42	1.6
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4842731)								
HK2302188-002	Anonymous	EK055A: Ammonia as N	7664-41-7	0.005	mg/L	39.2	38.7	1.2
EG: Metals and Major Cations (QC Lot: 4819027)								
HK2302462-002	Anonymous	EG020: Zinc	7440-66-6	1	µg/L	1330	1040	24.8
EP: Aggregate Organics (QC Lot: 4825271)								
HK2302278-006	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	<1	<1	0.0
EP: Aggregate Organics (QC Lot: 4836026)								
HK2302189-002	Anonymous	EP026: Chemical Oxygen Demand	----	2	mg/L	10	10	0.0
EG: Metals and Major Cations - Total (QC Lot: 4819027)								
HK2302462-002	Anonymous	EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	<0.1	0.0
		EG020: Chromium	7440-47-3	0.1	µg/L	<1.0	<1.0	0.0
		EG020: Lead	7439-92-1	0.1	µg/L	1.1	1.1	0.0
		EG020: Copper	7440-50-8	0.2	µg/L	2.9	2.9	0.0
		EG020: Aluminium	7429-90-5	5	µg/L	94	85	10.4
EG: Metals and Major Cations - Total (QC Lot: 4819028)								
HK2302471-004	R11-R3 (replicate)	EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	<0.1	0.0
		EG029: Chromium	7440-47-3	1	µg/L	<1	<1	0.0
		EG029: Copper	7440-50-8	1	µg/L	1	2	0.0
		EG029: Lead	7439-92-1	1	µg/L	<1	<1	0.0
		EG029: Zinc	7440-66-6	10	µg/L	144	142	1.7
		EG029: Aluminium	7429-90-5	10	µg/L	89	84	6.1

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 4817885)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	10 mg/L	104	----	85.1	117	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4818979)											
EK071K: Reactive Phosphorus as P	14265-44-2	0.001	mg/L	<0.001	0.5 mg/L	99.6	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4819423)											
EK085: Sulphide as S2-	18496-25-8	0.05	mg/L	<0.05	----	----	----	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4822122)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	97.7	----	94.9	102	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4842731)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	109	----	85.0	110	----	----
EG: Metals and Major Cations (QC Lot: 4819027)											
EG020: Zinc	7440-66-6	1	µg/L	<1	5 µg/L	101	----	88.7	115	----	----
EP: Aggregate Organics (QC Lot: 4817781)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	105	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 4825271)											
EP005: Total Organic Carbon	----	1	mg/L	<1	5 mg/L	93.4	----	83.4	124	----	----
				<1	100 mg/L	98.4	----	87.8	119	----	----
EP: Aggregate Organics (QC Lot: 4836026)											
EP026: Chemical Oxygen Demand	----	----	mg/L	----	20 mg/L	100	----	88.4	109	----	----
				----	200 mg/L	102	----	91.0	109	----	----
EP: Aggregate Organics (QC Lot: 4842605)											
EP020: Oil & Grease	----	1	mg/L	<0.1	20 mg/L	88.0	----	79.0	105	----	----
EG: Metals and Major Cations - Total (QC Lot: 4819027)											
EG020: Cadmium	7440-43-9	0.1	µg/L	<0.1	5 µg/L	96.0	----	85.0	115	----	----
EG020: Chromium	7440-47-3	0.1	µg/L	<0.1	5 µg/L	98.2	----	85.3	114	----	----
EG020: Copper	7440-50-8	0.2	µg/L	<0.2	5 µg/L	104	----	86.3	115	----	----
EG020: Lead	7439-92-1	0.1	µg/L	<0.1	5 µg/L	97.7	----	85.0	115	----	----
EG020: Aluminium	7429-90-5	5	µg/L	<5	5 µg/L	95.1	----	85.0	115	----	----
EG: Metals and Major Cations - Total (QC Lot: 4819028)											

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4819028) - Continued											
EG029: Cadmium	7440-43-9	0.1	µg/L	<0.1	10 µg/L	101	----	85.0	115	----	----
EG029: Chromium	7440-47-3	1	µg/L	<1	10 µg/L	97.4	----	85.0	115	----	----
EG029: Copper	7440-50-8	1	µg/L	<1	10 µg/L	98.0	----	85.0	115	----	----
EG029: Lead	7439-92-1	1	µg/L	<1	10 µg/L	100	----	85.0	115	----	----
EG029: Zinc	7440-66-6	10	µg/L	<10	10 µg/L	96.1	----	85.0	115	----	----
EG029: Aluminium	7429-90-5	10	µg/L	<10	10 µg/L	99.8	----	85.0	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4818979)										
HK2302462-001	Anonymous	EK071K: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	98.0	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4822122)										
HK2302588-001	Anonymous	EK067P: Total Phosphorus as P	----	5 mg/L	96.9	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 4842731)										
HK2302188-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.05 mg/L	# Not Determined	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 4819027)										
HK2302462-001	Anonymous	EG020: Zinc	7440-66-6	5 µg/L	89.2	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4825271)										
HK2302278-006	Anonymous	EP005: Total Organic Carbon	----	5 mg/L	99.6	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 4836026)										
HK2302189-001	Anonymous	EP026: Chemical Oxygen Demand	----	20 mg/L	99.5	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4819027)										
HK2302462-001	Anonymous	EG020: Cadmium	7440-43-9	5 µg/L	99.0	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 µg/L	97.9	----	75.0	125	----	----
		EG020: Copper	7440-50-8	5 µg/L	96.1	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 µg/L	94.7	----	75.0	125	----	----
		EG020: Aluminium	7429-90-5	5 µg/L	# Not Determined	----	75.0	125	----	----
EG: Metals and Major Cations - Total (QC Lot: 4819028)										
HK2302471-003	R11-R3	EG029: Cadmium	7440-43-9	10 µg/L	101	----	75.0	125	----	----
		EG029: Chromium	7440-47-3	10 µg/L	102	----	75.0	120	----	----
		EG029: Copper	7440-50-8	10 µg/L	100	----	75.0	125	----	----
		EG029: Lead	7439-92-1	10 µg/L	98.9	----	75.0	125	----	----
		EG029: Zinc	7440-66-6	10 µg/L	90.6	----	75.0	125	----	----
		EG029: Aluminium	7429-90-5	10 µg/L	# Not Determined	----	75.0	125	----	----

Matrix: WATER

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 4819028) - Continued										