



2018 ANNUAL NUNAVUT WATER BOARD REPORT FOR FOX-M

FOR THE
North Warning System

Contract # W8485-100224/001/NX
SOW Ref: 16.F.5.d

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Prepared for
North Warning System & Assoc. Projects
Aerospace Equipment Program Directorate
455 Blvd de la Carrière
11th Floor
Gatineau, Québec
K1A 0K2

Prepared by
Raytheon
Canada Limited
400 Cooper Street
Suite 3000
Ottawa, ON, K2P 2H8

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EXECUTIVE SUMMARY

This 2018 Annual Report for the Nunavut Water Board (NWB) has been prepared by Raytheon Canada Limited (RCL) for the Department of National Defence in order to meet the requirements of the licence issued 10 September 2009 3BC-FOH0919 – Type “B”, Part B “General Conditions”, paragraph 1. This report covers the period from 01 January to 31 December 2018.

RCL is the Operation and Maintenance Contractor for the North Warning System (NWS), including FOX-M, the attended (manned) NWS radar site located at Hall Beach, Nunavut.

The water usage at FOX-M in 2018 was 1031.5 cubic meters, which is an average of 2.8 cubic meters per day. There is no water usage limit in the licence for FOX-M because water is drawn from an artificial (man-made) reservoir and not from a natural source.

Sewage at FOX-M was processed by the tertiary wastewater treatment system. Some of the treated effluent is recycled as on site urinal/toilet flush water. The discharged treated effluent is of potable water quality. A sample of the treated effluent was sent for laboratory analysis each month in 2018.

Samples of the water contained in the berms of fuel storage facilities was sent for laboratory analysis and confirmed to be within effluent quality limits of the NWB licence 3BC-FOH0919, Part D, item 10 before the water was pumped out of the berms.

Hazardous waste and waste oil were sent to an approved hazardous waste disposal site outside of Nunavut as required by the licence. The hazardous waste was shipped to Qikiqtaaluk Environmental, through their subcontractor Veolia, 2630, boul. Industriel, Chambly, QC J3L 4V2. The hazardous waste consisted of 87 drums of assorted waste (oil, fuel, glycol, etc.).

Non-hazardous domestic solid waste was disposed of at the local landfill through a contract with the Hamlet of Hall Beach. RCL has documented authorization from the community for receiving the waste.

Two outdoors spill occurred at FOX-M in 2018:

3. NT-NU Spill Line Report Number 18-222. On 12June2018, the loader was running while parked next to the building train. When the operator returned to the loader a hydraulic fluid leak was noted. The spill was immediately cleaned up and the loader was moved to the garage where the failed O-ring that caused the spill was replaced. The impacted gravel was collected and containerized for disposal.
4. NT-NU Spill Line Report Number 18-328. On 15Aug2018 site personnel were refuelling one of the site pickup trucks by vehicle refueller tank W21E. The auto stop handle failed the shut off the flow of fuel once the vehicle was full, which resulted in a Jet A1 release of approximately 1 Litre. The impacted soil was collected and transferred to a drum for off-site disposal.

The Spill Contingency Plan was successfully implemented.



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1.0 INTRODUCTION

This 2018 Annual Report for the Nunavut Water Board (NWB) has been prepared by Raytheon Canada Limited (RCL) for the Department of National Defence in order to meet the requirements of the licence issued 10 September 2009 3BC-FOH0919 – Type “B”, Part B “General Conditions”, paragraph 1. This report covers the period of 01 January to 31 December 2018.

RCL is the Operation and Maintenance Contractor for the North Warning System (NWS), including FOX-M. FOX-M is an attended (manned) North Warning System radar site located at Hall Beach, Nunavut.

1.1 Report Details

Licensee: Department of National Defence, Government of Canada
Licence: 3BC-FOH0919 – Type “B”
Location: FOX-M North Warning System Site, Hall Beach, Qikiqtani Region, Nunavut
Report Prepared by: Raytheon Canada Limited, 05-Feb-2019
Time period covered: 01 January to 31 December 2018

2.0 WATER USE

The water usage at FOX-M in 2018 was 1,031.5 cubic meters, which is an average of 2.8 cubic meters per day. See Table 2-1 for raw water usage.

There is no water usage limit in the licence for FOX-M because water is drawn from an artificial (man-made) reservoir and not from a natural source.

Table 2-1: Monthly Raw Water Usage at FOX-M in 2018

Month	Raw water usage (m ³)
January	67.5
February	84
March	87.5
April	65
May	81.5
June	69
July	69
August	93.5
September	149.5
October	103
November	87
December	75
TOTAL	1,031.5



3.0 TREATED SEWAGE DISCHARGE

At FOX-M, the sewage and grey water were both processed through a Cycle-let® advanced tertiary wastewater treatment system. Some of the treated water is recycled as urinal/toilet flush water; the remainder is discharged at the designated outfall and is potable water quality. See Table 3-1, for the volume of sewage and grey water treated by the Cycle-let® system. See Section 6.0 for details on sewage effluent monitoring.

Table 3-1: Monthly and Annual Volume of Sewage and Grey Water Treated at FOX-M in 2018

Month	Volume of sewage and greywater treated then discharged or recycled (m³)
January	69.5
February	84.0
March	101.0
April	65.0
May	81.5
June	69.0
July	104.5
August	98.5
September	149.5
October	103.0
November	87.0
December	82.0
TOTAL	1,094.5

4.0 HAZARDOUS WASTE AND WASTE OIL DISPOSAL

Hazardous waste and waste oil were sent to an approved hazardous waste disposal site outside of Nunavut as required by the licence. The hazardous waste was shipped to Qikiqtaaluk Environmental, through their subcontractor Veolia, 2630, boul. Industriel, Chambly, QC J3L 4V2. The hazardous waste consisted of 87 drums of assorted waste (oil, fuel, glycol, etc.).

See Table 4-1 for the list of items sent for disposal.

See Annex A for the shipping documents including the completed movement documents for waste regulated under the Transportation of Dangerous Goods Regulations (TDGR) and NWS Manifests for non-regulated waste.

Table 4-1: Hazardous Waste and Waste Oil Sent for Disposal from FOX-M in 2018

Description, TDG shipping name	Quantity	Movement Document or Manifest #
Waste Jet A1 fuel	8 Drums	Movement Document 2464177-1
Waste fuel, aviation, turbine engine		
Waste Jet A1 fuel and water mixture	3 Drums	Movement Document 2464177-1
Waste fuel, aviation, turbine engine mixture		



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Description, TDG shipping name	Quantity	Movement Document or Manifest #
Waste Jet A1 fuel filters Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)	3 Drums	Movement Document 2464177-1
Waste fuel contaminated soil Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)	5 Drums	Movement Document 2464177-1
Waste POL soaked absorbent Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)	3 Drums	Movement Document 2464177-1
Waste aerosols (flammable)	1 Drum	Movement Document 2464177-1
Waste oily rags Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)	6 Drums	Movement Document 2464177-1
Waste oil Not TDG regulated	43 Drums	NWS Manifest TCN38415, TCN38418, TCN38416, TCN38430, TCN38432, TCN38433, TCN38436, TCN38406, TCN38408, TCN38409, TCN38407, TCN38404, TCN38420, TCN38417
Waste glycol (drum) Not TDG Regulated	9 Drums	NWS Manifest TCN38415, TCN38418, TCN38434, TCN38455, TCN38420
Waste Activated Carbon Filter Not Regulated	6 Drums	NWS Manifest TCN38457, TCN38458

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5.0 NON-HAZARDOUS SOLID WASTE DISPOSAL

Non-hazardous domestic solid waste was disposed of at the local landfill through a contract with the Municipality of Hall Beach. RCL has documented authorization from the community for receiving the waste. See Table 5-1 for the quantity of non-hazardous waste generated.

Table 5-1: Non-hazardous Domestic Solid Waste Sent for Disposal from FOX-M in 2018

Month	Waste Generated (kg)
January	950
February	1025
March	1204
April	889
May	966
June	989
July	1064
August	1241
September	1569
October	1188
November	932
December	1207
TOTAL	13,224

6.0 MONITORING PROGRAM

In 2018, a monitoring program was implemented at FOX-M as required by the water licence, Part I. The monitoring program included the following:

1. Volume of raw water drawn from the reservoir (FOH-1). The raw water monitoring information is shown in **Section 2.0 Water Use**.
2. Quality of sewage discharged from the final discharge point of the sewage treatment facility (FOH-2). The location of the sewage effluent outfall is shown in **Annex B**, including coordinates. The treated sewage was sampled monthly. The results of the analyses are shown in **Annex C: Analysis of Treated Sewage Effluent**
3. Quality of the water contained in the berms of fuel storage facilities prior to discharge (FOH-3) was analyzed and confirmed within the effluent quality limits listed in the water licence, Part D. The coordinates and the results of the analysis are shown in **Annex D: Location of Bermed Fuel Storage Facilities and Analysis of Berm Water**. All samples met the effluent requirements of the water licence, Part D.



7.0 SPILLS (UNAUTHORIZED DISCHARGES)

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
12-Jun-2018, Spill # 18-222	Hydraulic fluid	1 L	On 12June2018, the loader was running while parked next to the building train. When the operator returned to the loader a hydraulic fluid leak was noted. The spill was immediately cleaned up and the loader was moved to the garage where the failed O-ring that caused the spill was replaced. The impacted gravel was collected and containerized for disposal.	20 metres from the north side of B-Train MOD-10 area. (68°45'41.7"N, 81°13'32.6"W)
15-Aug-2018, Spill # 18-328	Jet A1	1 L	On 15Aug2018 site personnel were refuelling one of the site pickup trucks by vehicle refueller tank W21E. The auto stop handle failed the shut off the flow of fuel once the vehicle was full, which resulted in a Jet A1 release of approximately 1 Litre. The impacted soil was collected and transferred to a drum for off-site disposal.	Vehicle Refueller (68°45'41"N, 81°13'31"W)

The Spill Contingency Plan was successfully implemented.

8.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

The Spill Contingency Plan was updated on 29-Mar-2018. An updated copy of the Spill Contingency Plan was submitted to the NWS with the application for water licence renewal.

9.0 PROGRESSIVE RECLAMATION WORK UNDERTAKEN

No progressive reclamation work was undertaken in 2018.

10.0 ACRONYMS

Table 10-1: Acronyms

Acronym	Definition
n.o.s	Not Otherwise Specified
NWB	Nunavut Water Board
NWS	North Warning System
PCB	Polychlorinated Biphenyl
RCL	Raytheon Canada Limited
TDGR	Transportation of Dangerous Goods Regulations



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ANNEX A: HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2018

The 2018 Movement Document for TDG Regulated waste and NWS Manifests for non-TDG Regulated waste described in Table 4-1 are below.

MOVEMENT DOCUMENT / MANIFEST DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document/manifest conforms to all federal and provincial transport and environmental legislation.
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement et le transport.

2464177-1

Movement Document / Manifest Reference No.
N° de référence du document de mouvement/manifeste

A Generator / consigneur Registration No. / Provincial ID No. N° d'immatriculation - d'Id. provincial Company name / Nom de l'entreprise Department of National Defence 96 RCL Mailing address / Adresse postale 22 Wing Bldg 109 Hornet Heights ON P6H1P3 Tel. No. / N° de tél. 705-494-2011 ext 2864 Shipping site address / Adresse du lieu de l'expédition NWS LSS Hall Beach P.O. Box 46 City / Ville Hall Beach NU Postal code / Code postal X0A 0K0		B Carrier Transporteur Registration No. / Provincial ID No. N° d'immatriculation - d'Id. provincial Company name / Nom de l'entreprise NEAS (Nunavut eastern Arctic ship inc.) Mailing address / Adresse postale 2100 Ave. Pierre-Dupuy suite 200 Montréal, QC, H3C 3B5 Tel. No. / N° de tél. 1 877 225-6327 Vehicle / Vehicle Trailer - Rail car No. 1 1 ^{re} remorque - wagon Trailer - Rail car No. 2 2 ^e remorque - wagon Port of entry / Point d'entrée Port of exit / Point de sortie		C Receiver / consignee Réceptionnaire / destinataire Registration No. / Provincial ID No. N° d'immatriculation - d'Id. provincial Receiver / consignee information same as in Part A Les renseignements du réceptionnaire / destinataire est la même qu'à la Partie A <input type="checkbox"/> Yes / Oui <input type="checkbox"/> No, complete the box below / Non, remplir la case ci-dessous Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal Email / Courriel électronique Receiving site address / Adresse du lieu de destination Date received / Date de réception Year / Année Month / Mois Day / Jour Time / Heure A.M. <input type="checkbox"/> P.M. <input type="checkbox"/> If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférées, préciser le nom du destinataire Registration No. / Provincial ID No. N° d'immatriculation - d'Id. provincial															
Intended Receiver / consignee Réceptionnaire / destinataire prévu Qikiqtaaluk Environmental Mailing address / Adresse postale 983 de Chaparral E-mail / Courriel électronique Tjodine@genv.ca Receiving site address / Adresse du lieu de l'expédition Veeha, 2630, boul. Industriel City / Ville Chambly QC Postal code / Code postal J3L 4V2		Carrier Certification / Attestation du transporteur I certify that I have received waste or recyclable material from the generator / consigneur for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct. Je certifie avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets. Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimerie) MARIE-LEE ZIA ALBERT Year / Année Month / Mois Day / Jour Signature 18 09 14 Marie-Lee Zia Albert		Quantity received / Quantités reçues Units / Unités L or / ou kg Comments / Commentaires Handling Code / Code de manutention Shipment / Envoi Accepted / Accepté Refused / Refusé Pack. / Veh. / Cont. / Vab. Decomp. / Décomp.															
Prox. code Code prov.		Shipping name Appellation réglementaire		Class / Classe Sub. class(es) / Sous-classe(s)		UN No. N° UN		Packing / risk gr. Gr. d'emballage / de risque		Quantity shipped Quantité expédiée		Unit Unités		L or / ou kg		Packing Code		Phys. state Etat phys.	
(i)		Waste Aerosols		2-i		UN1950		45		kg		1		01		G			
(ii)		Waste Fuel, Aviation, Turbine Engine		3		UN1863		111		1200		L		8		01		L	
(iii)		Waste Fuel, Aviation, Turbine Engine Mixture		3		UN1863		111		560		L		3		01		L	
(iv)		Waste Solid Containing Flammable Liquid, N.O.S. (Fuel, Aviation, Turbine Engine)		4-i		UN3175		11		2172		kg		15		01		S	
Notice No. N° de notification		Notice Line No. N° de ligne de la notification		Shipment Envoi		Of / De		D or R code Code D ou R		C code Code C		Basic Annex VIII or OECD Code Annexe VIII de Base ou Code OCDE		H code Code H		Y code Code Y		Export Exportation	
(i)		* FLASH POINT 33°C																	
(ii)		International use only																	
(iii)		Emergency contact 24 hrs Canutes: 1-613-996-6666																	
Generator / consigneur certification: I certify that the information contained in Part A is correct and complete. Attestation du producteur / expéditeur: J'atteste que tous les renseignements à la partie A sont exacts et complets.		Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimerie) Jerry Paillog		Signature Paillog		Tel. No. / N° de tél. 705-494-2011 ext 2864													
Date shipped / Date d'expédition Year / Année Month / Mois Day / Jour		Time / Heure A.M. <input type="checkbox"/> P.M. <input type="checkbox"/>		Scheduled arrival date / Date d'arrivée prévue Year / Année Month / Mois Day / Jour															

MOE 04-1917 (07/07)

Instructions for completion and distribution on reverse / Instructions pour compléter et distribuer au verso

Copy / Copie 1 (white / blanche)

Figure 1: Movement Document 2464177-1

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SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Jul 28, 2018, 2:22 PM		TCN-38404			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 36" X 24" X 40"		Waybill #: DR-C22526			
				Total Pcs.: 1			
				Total Weight: 350 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
1	PALLET		2002406	WASTE - OIL, 45 GAL	F318-19		NON-REGULATED...ASSET 347831

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 2: NWS Shipping Manifest TCN-38404



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Jul 28, 2018, 2:35 PM		TCN-38405			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 54" X 54" X 44"		Waybill #: 1			
				Total Pcs.: 1			
				Total Weight: 1200 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
1	PALLET		2002505	WASTE - OILY RAGS	F318-7		UN3175...ASSET 344584
1			2002357	WASTE - FUEL CONTAMINATED SOIL	F318-7		UN3175...ASSET 340876
1			2002356	WASTE - OIL FILTERS	F318-7		ASSET 344585
1			2003635	WASTE - FUEL FILTERS (DRUM)	F318-7		UN3175...ASSET 349093

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 3: NWS Shipping Manifest TCN-38405

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Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Jul 28, 2018, 3:29 PM		TCN-38406			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" x 48" x 43"		Waybill #: DR-C22526			
				Total Pcs. 1			
				Total Weight: 1800 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET	2002406	WASTE - OIL, 45 GAL		F318-6		NON-REGULATED...ASSETS 347761, 347763, 347765, 347829

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 4: NWS Shipping Manifest TCN-38406



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Jul 28, 2018, 3:33 PM		TCN-38407			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" x 48" x 43"		Waybill #: DR-C22526			
				Total Pcs. 1			
				Total Weight: 1800 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET	2002406	WASTE - OIL, 45 GAL		F318-5		NON REGULATED...ASSETS 347762, 339989, 345519, 347760

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 5: NWS Shipping Manifest TCN-38407

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SOW Ref: 16.F.5.d

SHIPPING MANIFEST						
Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8				NON NEGOTIABLE		
Filled By: DVAUGHN		Date: Jul 28, 2018, 4:04 PM		TCN-38408		
Ship To: QIKIQTAAK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987			Priority 2	
Attention:				Attention:		
Carrier: NEAS		Routing: 48" x 24" x 43"		Waybill #: DR-C22521		Total Pcs. 1
						Total Weight: 900 LBS
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N
2	PALLET		2002406	WASTE - OIL, 45 GAL	F318-8	NON-REGULATED...ASSETS 345520, 345521
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.				Received By:		Date
				Received By:		Date

Figure 6: NWS Shipping Manifest TCN-38408



SHIPPING MANIFEST						
Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8				NON NEGOTIABLE		
Filled By: DVAUGHN		Date: Jul 28, 2018, 4:08 PM		TCN-38409		
Ship To: QIKIQTAAK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987			Priority 2	
Attention:				Attention:		
Carrier: NEAS		Routing: 56" x 30" x 45"		Waybill #: DR-C22733		Total Pcs. 1
						Total Weight: 1100 LBS
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N
2	PALLET		2002406	WASTE - OIL, 45 GAL	F318-9	NON-REGULATED...ASSETS 347764, 347830
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.				Received By:		Date
				Received By:		Date

Figure 7: NWS Shipping Manifest TCN-38409

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SOW Ref: 16.F.5.d

SHIPPING MANIFEST							
Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8						NON NEGOTIABLE	
Filled By: CMACDONALD		Date: Oct 16, 2015, 10:07 AM		TCN-34816			
Ship To: CLEAN HARBORS CANADA INC. 2730 BOULEVARD INDUSTRIEL CHAMBLY, QC, J3L 4V2 CA		From: LSS-Q, LSS IQALUIT, DND Storeroom Raytheon Canada Limited, LSS Iqaluit: BLDG.#2050 P.O. Box 1229 Iqaluit, NU, X0A 0H0 867-979-4818			Priority 1		
Attention:				Attention:			
Carrier: NEAS		Routing: IQALUIT-MONTREAL		Waybill #:		Total Pcs. 1	
						Total Weight: 1450 LBS	
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
41	CRATE	1450 LBS	2003658	WASTE - OIL (5 GALLON PAIL)	N/A	N/A	EIN AS FOLLOWS
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.					Received By:		Date
					Received By:		Date

Figure 8: NWS Shipping Manifest TCN-34816

SHIPPING MANIFEST							
Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8						NON NEGOTIABLE	
Filled By: DVAUGHN		Date: Jul 31, 2018, 11:45 AM		TCN-38417			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987			Priority 2		
Attention:				Attention:			
Carrier: NEAS		Routing: 48" X 45" X 43"		Waybill #: DR-C22524		Total Pcs. 1	
						Total Weight: 1800 LBS	
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET		2002406	WASTE - OIL, 45 GAL	XL18-17		NON-REGULATED...ASSETS 344608, 332058, 335584, 341359
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.					Received By:		Date
					Received By:		Date

Figure 9: NWS Shipping Manifest TCN-38417

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SOW Ref: 16.F.5.d



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Jul 31, 2018, 1:30 PM		TCN-38418			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach; P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" X 47" X 49"		Waybill #: DR-C22521			
		Total Pcs. 1		Total Weight: 1800 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
3	PALLET		2002406	WASTE - OIL, 45 GAL	XL18-9		NON-REGULATED...ASSETS 341367, 345855, 339424
1			2002344	WASTE - GLYCOL (DRUM)	XL18-9		NON-REGULATED...ASSET 350457
0							*Original Asset 332106 was duplicated on TCN 38434. Created new Asset 350457.
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.						Received By:	
						Date	
Received By:						Date	

Figure 10: NWS Shipping Manifest TCN-38418

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SOW Ref: 16.F.5.d



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Jul 31, 2018, 4:02 PM		TCN-38420			
Ship To: QUIKTAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" X 46" X 42"		Waybill #: DR-C22526			
				Total Pcs. 1			
				Total Weight: 1800 LBS			
QTY	Type	Line	Item	Description	WO or PO	B/Code or S/N	Remarks
0							*Original Asset 339424 was duplicated on TCN 38418. Created new Asset 350453.
3	PALLET	2002406		WASTE - OIL, 45 GAL	XL18-21		NON-REGULATED...ASSETS 350453, 339426, 349011
1		2002344		WASTE - GLYCOL (DRUM)	XL18-21		NON-REGULATED...ASSET 349424
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.							
					Received By:	Date	
					Received By:	Date	

Figure 11: NWS Shipping Manifest TCN-38420

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UNCLASSIFIED

SOW Ref: 16.F.5.d



SHIPPING MANIFEST						
Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8					NON NEGOTIABLE	
Filled By: DVAUGHN		Date: Aug 2, 2018, 10:41 AM		TCN-38430		
Ship To:		QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA		From:		Priority
2630, BOUL. INDUSTRIEL				LSS-F/FOX-M, HALL BEACH, DND Storeroom		2
CHAMBLY, QC, J3L 4V2				Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46		
1-866-634-6367				Hall Beach, NU, X0A 0K0 867-928-8987		
Attention:				Attention:		
Carrier:		Routing:		Waybill #:		Total Pcs.
NEAS		48" X 40" X 42"		DR-C22524		1
						Total Weight:
						900 LBS
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N
2	PALLET		2002406	WASTE - OIL, 45 GAL	XL18-6	
						NON-REGULATED...ASSETS 350454, 347296
						*Original Asset 339426 was duplicated on TCN 38420. Created new Asset 350454.
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.				Received By:		Date
				Received By:		Date

Figure 12: NWS Shipping Manifest TCN-38430



SHIPPING MANIFEST						
Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8					NON NEGOTIABLE	
Filled By: DVAUGHN		Date: Aug 2, 2018, 10:43 AM		TCN-38432		
Ship To:		QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA		From:		Priority
2630, BOUL. INDUSTRIEL				LSS-F/FOX-M, HALL BEACH, DND Storeroom		2
CHAMBLY, QC, J3L 4V2				Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46		
1-866-634-6367				Hall Beach, NU, X0A 0K0 867-928-8987		
Attention:				Attention:		
Carrier:		Routing:		Waybill #:		Total Pcs.
NEAS		48" X 48" X 41"		DR-C22521		1
						Total Weight:
						1800 LBS
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N
4	PALLET		2002406	WASTE - OIL, 45 GAL	XL18-8	
						NON-REGULATED...ASSETS 338926, 340445, 349165, 349166
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.				Received By:		Date
				Received By:		Date

Figure 13: NWS Shipping Manifest TCN-38432

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SOW Ref: 16.F.5.d



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Aug 2, 2018, 10:47 AM		TCN-38433			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" X 46" X 44"		Waybill #: DR-C22524			
				Total Pcs. 1			
				Total Weight: 1800 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET		2002406	WASTE - OIL, 45 GAL	XL18-11		NON-REGULATED...ASSETS 339437, 345734, 345735, 349167
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.							
				Received By:		Date	
				Received By:		Date	

Figure 14: NWS Shipping Manifest TCN-38433



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Aug 2, 2018, 10:49 AM		TCN-38434			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" X 48" X 42"		Waybill #: DR-C22524			
				Total Pcs. 1			
				Total Weight: 1800 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET		2002344	WASTE - GLYCOL (DRUM)	XL18-12		NON-REGULATED...ASSETS 332106, 347303, 344583, 349168
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.							
				Received By:		Date	
				Received By:		Date	

Figure 15: NWS Shipping Manifest TCN-38434

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SOW Ref: 16.F.5.d



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Aug 2, 2018, 10:55 AM		TCN-38436			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" X 47" X 41"		Waybill #: DR-C22521			
				Total Pcs.: 1			
				Total Weight: 1800 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET		2002406	WASTE - OIL, 45 GAL	XL18-16		NON-REGULATED...ASSETS 349013, 349012, 349171, 349172

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 16: NWS Shipping Manifest TCN-38436



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Aug 3, 2018, 11:04 AM		TCN-38455			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 24" X 42" X 40"		Waybill #: DR-C22524			
				Total Pcs.: 1			
				Total Weight: 500 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
0							*Original Asset 347303 was duplicated on TCN 38434. Created new Asset 350455.
1	PALLET		2002344	WASTE - GLYCOL (DRUM)	XL18-24		NON-REGULATED...ASSET 350455

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 17: NWS Shipping Manifest TCN-38455

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SOW Ref: 16.F.5.d



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Aug 3, 2018, 11:09 AM		TCN-38457			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" X 48" X 24"		Waybill #: DR-C22524			
				Total Pcs.: 1			
				Total Weight: 1540 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET		2002351	WASTE - ACTIVATED CARBON FILTE	XL18-7		NON-REGULATED...ASSETS 349098, 349099, 349100, 349101

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 18: NWS Shipping Manifest TCN-38457



SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By: DVAUGHN		Date: Aug 3, 2018, 11:11 AM		TCN-38458			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987		Priority 2			
Attention:		Attention:					
Carrier: NEAS		Routing: 48" X 40" X 42"		Waybill #: DR-C22524			
				Total Pcs.: 1			
				Total Weight: 810 LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
2	PALLET		2002351	WASTE - ACTIVATED CARBON FILTE	XL18-13		NON-REGULATED...ASSETS 349102, 349103

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

Figure 19: NWS Shipping Manifest TCN-38458

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SOW Ref: 16.F.5.d

ANNEX B: TREATED SEWAGE EFFLUENT OUTFALL (FOH-2) LOCATION WITH CO-ORDINATES



Coordinates of sewage treatment outfall: 63° 45'39.50"N, 81°13'28.40"W.

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**ANNEX C: ANALYSIS OF TREATED SEWAGE EFFLUENT**

Table C-1: Summary of Analysis of Treated Sewage Effluent at FOX-M in 2018

Sample Date	Parameter				
	pH	Oil and Grease (Present - P / Absent - A)	Biological Oxygen Demand (mg/L)	Total Suspended Solids (mg/L)	Faecal Coliforms ¹
Maximum Concentration	6.0 to 9.0 (pH units)	No visible sheen	120 mg/L	180 mg/L	10,000 CFU/100 mL
8-Jan-18	7.39	A	<1	2	0
2-Feb-18	7.39	A	<1	<2	3
5-Mar-18	8.12	A	2	3	0
2-Apr-18	7.84	A	1	19	4
7-May-18	7.46	A	<1	<2	61
5-Jun-18	7.88	A	<1	<2	0
9-Jul-18	7.18	A	<1	<2	7
7-Aug-18	7.66	A	<1	2	0
6-Sep-18	7.64	A	14	5	0
1-Oct-18	7.65	A	8	<2	813
1-Nov-18	7.99	P	<1	<2	28
10-Dec-18	7.41	A	<1	<2	9

¹ This column contains the average of the Cyclet 1A, Cyclet 1B, and Cyclet 1C



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SOW Ref: 16.F.5.d



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 16-02611-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1800787
Date Submitted: 2018-01-17
Date Reported: 2018-01-23
Project: Fox-Main
COC #: 184709

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry		pH	1.00		7.39	1341324 Sewage 2018-01-08 Fox-Main Cyclet
		Total Suspended Solids	2	mg/L	2	
Oil & Grease		Oil & Grease - Mineral	1	mg/L	<1	
		Oil & Grease - Non-mineral	1	mg/L	<1	
		Oil & Grease - Total	1	mg/L	<1	
Subcontract		BOD5	1	mg/L	<1	
Visible Sheen		Visible Sheen		P/A	A	

Guideline =

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 20: January 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#:
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1800826
Date Submitted: 2018-01-17
Date Reported: 2018-01-18
Project:
COC #: 184709

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1341444 Sewage 2018-01-08 Fox Main Cyclet 1A	1341445 Sewage 2018-01-08 Fox Main Cyclet 1B	1341446 Sewage 2018-01-08 Fox Main Cyclet 1C
Others		Faecal Coliforms	0	ct/100mL			0	0	0

Figure 21: January 2018, sewage effluent laboratory results page 2 of 2

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UNCLASSIFIED

SOW Ref: 16.F.5.d



Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#:
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1801867
Date Submitted: 2018-02-07
Date Reported: 2018-02-14
Project: FOX-MAIN
COC #: 184702

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry		pH	1.00			1344306 Sewage
		Total Suspended Solids	2	mg/L		2018-02-01 FOX-MAIN CYCLE-LET
Oil & Grease		Oil & Grease - Mineral	1	mg/L		
		Oil & Grease - Non-mineral	1	mg/L		
		Oil & Grease - Total	1	mg/L		
Subcontract		BOD5	1	mg/L		
Visible Sheen		Visible Sheen		P/A		

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 22: February 2018, sewage effluent laboratory results page 1 of 2



Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#:
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1801866
Date Submitted: 2018-02-07
Date Reported: 2018-02-08
Project: FOX-MAIN
COC #: 184702

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1344303 Sewage 2018-02-01 FOX-MAIN CYCLE-LET A	1344304 Sewage 2018-02-01 FOX-MAIN CYCLE-LET B	1344305 Sewage 2018-02-01 FOX-MAIN CYCLE-LET C
Others		Faecal Coliforms	0	ct/100mL			3	3	2

Figure 23: February 2018, sewage effluent laboratory results page 2 of 2

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SOW Ref: 16.F.5.d



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 16-02611-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1803430
Date Submitted: 2018-03-09
Date Reported: 2018-03-21
Project: FOX-Main
COC #: 184706

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1348337 Wastewater 2018-03-05 FOX-Main Cyclet
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			8.12
	Total Suspended Solids	2	mg/L		3
Oil & Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		<1
	Oil & Grease - Total	1	mg/L		<1
Subcontract	BOD5	1	mg/L		2
Visible Sheen	Visible Sheen		P/A		A

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 24: March 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 16-02611-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1803416
Date Submitted: 2018-03-09
Date Reported: 2018-03-11
Project: FOX-Main
COC #: 184706

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1348292 Sewage - 2018-03-05 Fox-Main Cyclet A	1348293 Sewage - 2018-03-05 Fox-Main Cyclet B	1348294 Sewage - 2018-03-05 Fox-Main Cyclet C
Group	Analyte	MRL	Units	Guideline				
Others	Faecal Coliforms	0	ct/100mL			0	0	0

Figure 25: March 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#:
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1804979
Date Submitted: 2018-04-06
Date Reported: 2018-04-11
Project: Fox-Main
COC #: 183409

					Lab I.D.	1352512
					Sample Matrix	Sewage
					Sample Type	
					Sampling Date	2018-04-02
					Sample I.D.	FOX-MAIN CYCLE-LET
Group	Analyte	MRL	Units	Guideline		
General Chemistry	pH	1.00			7.84	
	Total Suspended Solids	2	mg/L		19	
Nutrients	BOD5	1	mg/L		1	
Oil & Grease	Oil & Grease - Mineral	1	mg/L		<1	
	Oil & Grease - Non-mineral	1	mg/L		<1	
	Oil & Grease - Total	1	mg/L		<1	
Visable Sheen	Visible Sheen		P/A		A	

Guideline =

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, IPWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 26: April 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#:
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1804999
Date Submitted: 2018-04-06
Date Reported: 2018-04-08
Project: Fox-Main
COC #: 183409

					Lab I.D.	1352590	1352591	1352592
					Sample Matrix	Sewage	Sewage	Sewage
					Sample Type			
					Sampling Date	2018-04-02	2018-04-02	2018-04-02
					Sample I.D.	Fox-Main-Cycle-let A	Fox-Main-Cycle-let B	Fox-Main-Cycle-let C
Group	Analyte	MRL	Units	Guideline				
Others	Faecal Coliforms	0	ct/100mL		1	6	4	

Figure 27: April 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1807312
Date Submitted: 2018-05-11
Date Reported: 2018-05-18
Project: FOX-Main
COC #: 184705

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1358507 WW 2018-05-07 Fox-Main Cyclet
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			7.46
	Total Suspended Solids	2	mg/L		<2
Nutrients	BOD5	1	mg/L		<1
Oil & Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		<1
	Oil & Grease - Total	1	mg/L		<1
Visible Sheen	Visible Sheen		P/A		A

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

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Figure 28: May 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1807330
Date Submitted: 2018-05-11
Date Reported: 2018-05-13
Project: FOX-Main
COC #: 184705

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.			
					1358544 WW - 2018-05-07 FOX-Main Cyclet A	1358545 WW - 2018-05-07 FOX-Main Cyclet B	1358546 WW - 2018-05-07 FOX-Main Cyclet C	
Group	Analyte	MRL	Units	Guideline				
Others	Faecal Coliforms	0	ct/100mL		36	39	109	

Figure 29: May 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1809414
Date Submitted: 2018-06-11
Date Reported: 2018-06-18
Project: FOX-Main
COC #: 184690

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry		BOD5	1	mg/L		1364554 WW
		pH	1.00			2018-06-05 FOX-Main Cyclet LCT
		Total Suspended Solids	2	mg/L		
Oil and Grease		Oil & Grease - Mineral	1	mg/L		
		Oil & Grease - Non-mineral	1	mg/L		
		Oil & Grease - Total	1	mg/L		
		Visible Sheen		P/A		

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

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Figure 30: June 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1809433
Date Submitted: 2018-06-11
Date Reported: 2018-06-12
Project: Fox-Main
COC #: 184690

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1364599 Sewage	1364600 Sewage	1364601 Sewage
Others		Faecal Coliforms	0	ct/100mL		2018-06-05 FOX-MAIN CYCLE-LET A	1	0	0

Figure 31: June 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 17-00919
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1812245
Date Submitted: 2018-07-13
Date Reported: 2018-07-20
Project:
COC #: 188713

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1373862 Sewage 2018-07-09 FOX-MAIN CYCLE-LET
General Chemistry	BOD5	1	mg/L		<1
	pH	1.00			7.18
	Total Suspended Solids	2	mg/L		<2
Oil and Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		<1
	Oil & Grease - Total	1	mg/L		<1
	Visible Sheen		P/A		A

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

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Figure 32: July 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 17-00919
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1812272
Date Submitted: 2018-07-13
Date Reported: 2018-07-14
Project:
COC #: 188713

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1373920 Sewage - 2018-07-09 Fox-Main Cycle-Let-A	1373921 Sewage - 2018-07-09 Fox-Main Cycle-Let-B	1373922 Sewage - 2018-07-09 Fox-Main Cycle-Let-C
Group	Analyte	MRL	Units	Guideline				
Others	Faecal Coliforms	0	ct/100mL			7	11	4

Figure 33: July 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1814487
Date Submitted: 2018-08-15
Date Reported: 2018-08-21
Project:
COC #: 834700

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.				
1380825 Sewage 2018-08-07 Fox-Main Cycle-Let				
Group	Analyte	MRL	Units	Guideline
General Chemistry	BOD5	1	mg/L	<1
	pH	1.00		7.66
	Total Suspended Solids	2	mg/L	2
Oil and Grease	Oil & Grease - Mineral	1	mg/L	<1
	Oil & Grease - Non-mineral	1	mg/L	1
	Oil & Grease - Total	1	mg/L	1
	Visible Sheen		P/A	A

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 34: August 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 17-00919
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1814529
Date Submitted: 2018-08-15
Date Reported: 2018-08-16
Project:
COC #: 834700

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.				
1381001 Sewage 2018-08-15 Fox-Main Cycle-Let A				
1381002 Sewage 2018-08-15 Fox-Main Cycle-Let B				
1381003 Sewage 2018-08-15 Fox-Main Cycle-Let C				
Group	Analyte	MRL	Units	Guideline
Others	Faecal Coliforms	0	ct/100mL	0

Figure 35: August 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1816477
Date Submitted: 2018-09-12
Date Reported: 2018-09-19
Project:
COC #: 835617

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1386764 Sewage 2018-09-06 Fox-Main Cycle-Let
Group	Analyte	MRL	Units	Guideline	
General Chemistry	BOD5	1	mg/L		14
	pH	1.00			7.64
	Total Suspended Solids	2	mg/L		5
Oil and Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		<1
	Oil & Grease - Total	1	mg/L		<1
	Visible Sheen		P/A		A

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 36: September 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1816489
Date Submitted: 2018-09-12
Date Reported: 2018-09-13
Project:
COC #: 835617

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1386792 Sewage 2018-09-06 Fox-Main Cycle-Let - A	1386793 Sewage 2018-09-06 Fox-Main Cycle-Let -B	1386794 Sewage 2018-09-06 Fox-Main Cycle-Let - C
Group	Analyte	MRL	Units	Guideline				
Others	Faecal Coliforms	0	ct/100mL			0	0	0

Figure 37: September 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1818356
Date Submitted: 2018-10-09
Date Reported: 2018-10-16
Project:
COC #: 836399

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1392131 Sewage 2018-10-01 Fox-Main Cycle-Let
Group	Analyte	MRL	Units	Guideline	
General Chemistry	BOD5	1	mg/L		8
	pH	1.00			7.65
	Total Suspended Solids	2	mg/L		<2
Oil and Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		<1
	Oil & Grease - Total	1	mg/L		<1
	Visible Sheen		P/A		A

Guideline =

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 38: October 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1818335
Date Submitted: 2018-10-09
Date Reported: 2018-10-10
Project:
COC #: 836399

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1392088 Sewage 2018-10-01 Fox-Main Cycle-Let - A	1392089 Sewage 2018-10-01 Fox-Main Cycle-Let - B	1392090 Sewage 2018-10-01 Fox-Main Cycle-Let - C
Group	Analyte	MRL	Units	Guideline				
Others	Faecal Coliforms	0	ct/100mL			690	940	810

Figure 39: October 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1820274
Date Submitted: 2018-11-07
Date Reported: 2018-11-14
Project:
COC #: 837597

		Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
			1397669	Sewage		
					2018-11-01	Fox-Main Cycle-let
Group	Analyte	MRL	Units	Guideline		
General Chemistry	BOD5	1	mg/L		<1	
	pH	1.00			7.99	
	Total Suspended Solids	2	mg/L		<2	
Oil and Grease	Oil & Grease - Mineral	1	mg/L		<1	
	Oil & Grease - Non-mineral	1	mg/L		<1	
	Oil & Grease - Total	1	mg/L		<1	
	Visible Sheen	0	A/P		P	

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

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Figure 40: November 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1820323
Date Submitted: 2018-11-07
Date Reported: 2018-11-08
Project:
COC #: 837597

		Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
			1397775	Sewage		
					2018-11-01	Fox-Main Cycle-let A
			1397776	Sewage		
					2018-11-01	Fox-Main Cycle-let B
			1397777	Sewage		
					2018-11-01	Fox-Main Cycle-let C
Group	Analyte	MRL	Units	Guideline		
Others	Faecal Coliforms	0	ct/100mL		17	19

Figure 41: November 2018, sewage effluent laboratory results page 2 of 2

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Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1822406
Date Submitted: 2018-12-13
Date Reported: 2018-12-19
Project:
COC #: 838968

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1403970 Sewage 2018-12-10 Fox-Main Cycle-Let
Group	Analyte	MRL	Units	Guideline	
General Chemistry	BOD5	1	mg/L		2
	pH	1.00			7.46
	Total Suspended Solids	2	mg/L		<2
Oil and Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		<1
	Oil & Grease - Total	1	mg/L		<1
	Visible Sheen		P/A		A

Guideline =

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 3

Figure 42: December 2018, sewage effluent laboratory results page 1 of 2



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1822429
Date Submitted: 2018-12-13
Date Reported: 2018-12-14
Project:
COC #: 838968

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.			
					1404061 Sewage 2018-12-10 Raytheon // Fox-Main Cycle-Let A	1404062 Sewage 2018-12-10 Raytheon // Fox-Main Cycle-Let B	1404063 Sewage 2018-12-10 Raytheon // Fox-Main Cycle-Let C	
Group	Analyte	MRL	Units	Guideline				
Microbiology	Faecal Coliforms	0	ct/100mL		6	10	10	

Figure 43: December 2018, sewage effluent laboratory results page 2 of 2

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ANNEX D: LOCATION OF BERMED FUEL STORAGE FACILITIES AND ANALYSIS OF BERM WATER ²

Table D-1: Analysis of Berm Water at FOX-M in 2018

Berm	Maximum concentration of any grab sample (ug/L)	HAL W20B	HAL W20D&E	HAL W20F	HAL W22A	HAL W22B
Location on-site		Beach	Airstrip	Beach	Summit	Summit
Discharge Latitude ³		68°46'23.9 3"N	68°46'15.8 5"N	68°46'23.7 5"N	68°45'42.2 4"N	68°45'43.0 0"N
Discharge Longitude		81°12'51.1 1"W	81°13'58.3 3"W	81°12'46.1 2"W	81°13'25.0 4"W	81°13'27.2 7"W
Date		25-Jun-18	23-Jun-18	25-Jun-18	23-Jun-18	23-Jun-18
pH (pH Units)	6 to 9	7.76	7.77	7.86	7.88	7.85
Oil and Grease (ug/L)	5000	<1000	<1000	<1000	<1000	<1000
Arsenic (total) (ug/L)	100	<20	<20	<20	<20	<20
Cadmium (dissolved) (ug/L)	10	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium (dissolved) (ug/L)	100	<1	1	<1	<1	<1
Cobalt (dissolved) (ug/L)	50	<0.2	<0.2	<0.2	<0.2	<0.2
Copper (dissolved) (ug/L)	200	1	1	2	1	4
Lead (dissolved) (ug/L)	50	<1	<1	<1	<1	<1

² Effluent from bermed fuel storage facilities.

³ Final discharge point of bermed fuel storage facility



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Berm	Maximum concentration of any grab sample (ug/L)	HAL W20B	HAL W20D&E	HAL W20F	HAL W22A	HAL W22B
Location on-site		Beach	Airstrip	Beach	Summit	Summit
Discharge Latitude ³		68°46'23.93"N	68°46'15.85"N	68°46'23.75"N	68°45'42.24"N	68°45'43.00"N
Discharge Longitude		81°12'51.11"W	81°13'58.33"W	81°12'46.12"W	81°13'25.04"W	81°13'27.27"W
Date		25-Jun-18	23-Jun-18	25-Jun-18	23-Jun-18	23-Jun-18
Mercury (total) (ug/L)	0.6	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel (dissolved) (ug/L)	200	<5	<5	<5	<5	<5
PCB (total) (ug/L)	1000	<0.1	<0.1	<0.1	<0.1	<0.1
Phenols (ug/L)	20	<1	<1	<1	<1	<1
Zinc (total) (ug/L)	500	<40	<40	<40	<40	<40
Benzene (ug/L)	370	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene (ug/L)	2	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl benzene (ug/L)	90	<0.5	<0.5	<0.5	<0.5	<0.5

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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811301
Date Submitted: 2018-07-04
Date Reported: 2018-07-11
Project: FOX-M
COC #: 197617

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.					1370307 Water 2018-06-25 XL-W20B-1
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			7.76
Mercury	Hg	0.0001	mg/L		<0.0001
Metals	Aqua-Regia Digest				Y
	As	0.02	mg/L		<0.02
	Zn	0.04	mg/L		<0.04
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		100
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline = * = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Page 2 of 5

Figure 44: HAL W20B berm water laboratory results, page 1 of 2

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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811303
Date Submitted: 2018-07-04
Date Reported: 2018-07-06
Project: FOX-M
COC #: 197617

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1370310 Water 2018-06-25 XL-W20 B-1
Group	Analyte	MRL	Units	Guideline	
Metals	Cd	0.0001	mg/L		<0.0001
	Co	0.0002	mg/L		<0.0002
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L		0.001
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L		<0.001

Figure 45: HAL W20B berm water laboratory results, page 2 of 2

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Environment Testing

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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811304
Date Submitted: 2018-07-04
Date Reported: 2018-07-11
Project: FOX-M
COC #: 192664

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.					1370311 Water 2018-06-23 XL-W20 D-1
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			7.77
Mercury	Hg	0.0001	mg/L		<0.0001
Metals	Aqua-Regia Digest				Y
	As	0.02	mg/L		<0.02
	Zn	0.04	mg/L		<0.04
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		101
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Figure 46: HAL W20D&E berm water laboratory results, page 1 of 2

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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811305
Date Submitted: 2018-07-04
Date Reported: 2018-07-06
Project: FOX-M
COC #: 192664

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1370312 Water
Group	Analyte	MRL	Units	Guideline	2018-06-23 XL-W20 D-1
Metals	Cd	0.0001	mg/L		<0.0001
	Co	0.0002	mg/L		<0.0002
	Cr	0.001	mg/L		0.001
	Cu	0.001	mg/L		0.001
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L		<0.001

Figure 47: HAL W20D&E berm water laboratory results, page 2 of 2

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Client: Raytheon Canada Limited Ottawa
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Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811306
Date Submitted: 2018-07-04
Date Reported: 2018-07-11
Project: FOX-M
COC #: 197629

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1370313 Water 2018-06-25 XL-W20 F-1
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			7.86
Mercury	Hg	0.0001	mg/L		<0.0001
Metals	Aqua-Regia Digest				Y
	As	0.02	mg/L		<0.02
	Zn	0.04	mg/L		<0.04
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		93
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline = * = Guideline Exceedence
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Figure 48: HAL W20F berm water laboratory results, page 1 of 2

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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811307
Date Submitted: 2018-07-04
Date Reported: 2018-07-06
Project: FOX-M
COC #: 197629

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1370314 Water 2018-06-25 XL-W20 E-1
Group	Analyte	MRL	Units	Guideline	
Metals	Cd	0.0001	mg/L		<0.0001
	Co	0.0002	mg/L		<0.0002
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L		0.002
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L		<0.001

Figure 49: HAL W20F berm water laboratory results, page 2 of 2



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Environment Testing

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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811299
Date Submitted: 2018-07-04
Date Reported: 2018-07-11
Project: FOX-M
COC #: 192665

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.					1370305 Water 2018-06-23 XL-W22 A-1
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			7.88
Mercury	Hg	0.0001	mg/L		<0.0001
Metals	Aqua-Regia Digest				Y
	As	0.02	mg/L		<0.02
	Zn	0.04	mg/L		<0.04
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		98
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline =

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Figure 50: HAL W22A berm water laboratory results, page 1 of 2

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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811300
Date Submitted: 2018-07-04
Date Reported: 2018-07-06
Project: FOX-M
COC #: 192665

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1370306 Water 2018-06-23 XL-W22 A-1
Group	Analyte	MRL	Units	Guideline	
Metals	Cd	0.0001	mg/L		<0.0001
	Co	0.0002	mg/L		<0.0002
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L		0.001
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L		<0.001

Figure 51: HAL W22A berm water laboratory results, page 2 of 2



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Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811297
Date Submitted: 2018-07-04
Date Reported: 2018-07-11
Project: FOX-M
COC #: 192666

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1370303 Water 2018-06-23 XL-W22 B-1
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			7.85
Mercury	Hg	0.0001	mg/L		<0.0001
Metals	Aqua-Regia Digest				Y
	As	0.02	mg/L		<0.02
	Zn	0.04	mg/L		<0.04
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		100
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline =

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Page 2 of 5

Figure 52: HAL W22B berm water laboratory results, page 1 of 2

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SOW Ref: 16.F.5.d



Environment Testing

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 0021060-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1811298
Date Submitted: 2018-07-04
Date Reported: 2018-07-06
Project: FOX-M
COC #: 192666

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1370304 Water 2018-06-23 XL-W22 B-1
Group	Analyte	MRL	Units	Guideline	
Metals	Cd	0.0001	mg/L		<0.0001
	Co	0.0002	mg/L		<0.0002
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L		0.004
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L		<0.001

Figure 53: HAL W22B berm water laboratory results, page 2 of 2

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