Subject: Airport Project Update

Report to: Committee of the Whole

Report date: Thursday, May 2, 2019

Recommendations

1. That Niagara Regional Council **APPROVE** the Action Plan outlined in Appendix 1 of this report which directs staff to enact Regional Council's direction to: pursue adopting sole-responsibility for the operations and governance of Niagara District Airport (NDA) and Niagara Central Dorothy Rungeling Airport (NCDRA);

2. That outcomes of the Action Plan and/or adoption of the operations of the airports, resulting in incremental operating and/or capital budget requirements **BE REFERRED** for consideration as part of the 2020 budget process.

Key Facts

- The purpose of this report is to provide Council with an overview of the current status of the Airport project, as well as provide an action plan to outline the next steps.

- On September 22, 2016, Regional Council approved the following two motions:

  That Niagara Region **SUPPORT IN PRINCIPLE** adopting sole-responsibility for operations and governance of Niagara District Airport (NDA) and Niagara Central Dorothy Rungeling Airport (NCDRA);

  That, ***subject to completion of a phase 2 environmental assessment paid for by the current owners/operators***, Regional staff **BE AUTHORIZED** to initiate detailed negotiations with the current funding partners of both the NDA and the NCDRA to transition responsibility to Niagara Region.

- The Phase 2 Environmental Assessment reports for both airports in 2017 has been included in Appendix 3 and Appendix 4 of this report.

- Based on the financial analysis conducted in 2016 and outlined in reports TSC-C-12-2016 *Niagara District Governance and Funding Review* and TSC-C-13-2016 *Niagara Central Dorothy Rungeling Airport Governance and Funding Review*, the total annual financial impact to the Region, including capital financing, is estimated at $2.24M which equates to a 0.6% increase to the 2019 approved Regional levy. The total capital investment forecasted through 2037 is $35.3M with $11M (2016$)

identified for investment prior to 2021. This has not been included in the operating or capital budget forecasts provided with the 2019 budgets.

- The Action Plan outlined in Appendix 1 of this report outlines the planned next steps in the airport project including anticipated Council decision points. Upon approval of the Action Plan, continued Regional Council support in the pursuit of adopting sole-responsibility for the operations and governance of both airports is assumed. Staff will begin negotiations with the current funding partners to transition responsibility to Niagara Region.

Financial Considerations

The Region's approved budget does not currently incorporate funding related to the governance or operation of an airport. Should the Region assume such a role, there will be direct financial implications in terms of the annual operating and capital funding commitments, as well as the associated risks. Airports rely on ongoing investment to meet compliance requirements and to leverage development opportunities. As such, the needs of the airports as provided below in Table 1 will result in pressure on the existing capital funding gap of $481M (as reported in the 2019 Budget process), debt financing and the annual repayment limit (ARL). The incremental annual impact on the budget of 100% of the costs of the airports going forward as per the tables below is $2.24M equivalent to 0.6% increase to the 2019 Region tax levy.

Table 1 – Total estimated annual operating budget – Base Case Scenario

million $	2019	2020	2021	2022	2023	2024	2025
Net Operating Cost	0.41	0.42	0.42	0.42	0.42	0.42	0.42
Capital Financing Cost	1.83	1.86	1.90	1.94	1.98	2.02	2.06
Total Operating Impact	2.24	2.28	2.31	2.35	2.40	2.43	2.47

* Revenues exclude Municipal Grant Revenue and expenses exclude capital financing costs. All figures in 2016$ and include inflation at 2% per year.

Based on the financial analysis outlined in reports TSC-C-12-2016, *Niagara District Governance and Funding Review and TSC-C-13-2016 Niagara Central Dorothy Rungeling Airport Governance and Funding Review*, the total annual operating impact to the Region, including capital financing (Table 1 above) is $2.24M.The total capital investment between 2016 and 2037 is estimated at $35.3M ($2016), including $11M identified as immediate investment prior to 2021.

As this financial overview relies on reports dating from 2016, and given that there are multiple variables involved, staff will conduct a full review with updated financial impacts and will verify or develop a capital strategy for the airports for Council's consideration.

Niagara District Airport

Based on the original TSC 12-2016 report recommendation for joint governance and Regional financial contributions of 50% funding, the estimated Regional share would be $0.7M, equivalent to a 0.2% increase to the 2019 approved Regional levy. If the Region assumes all the costs outlined in table 2 below, inclusive of the 50% municipal contribution of $0.7 M, this would require an additional 0.2% increase to the 2019 approved Regional levy but could be mitigated with reductions in the local levy in Niagara-on-the-Lake, St. Catharines and Niagara Falls. Excluding passenger services, the capital costs were forecasted to be $20.7M to 2037 ($2016), with $4.0M required before 2021.

The total $1.4M in annual operating costs are net of land lease revenues and airport user fees, and this is an area which can be further explored to grow as a source of revenue to the airport.

Table 2: Niagara District Airport estimated annual operating budget – Base Case Scenario

million $	2019	2020	2021	2022	2023	2024	2025
Net Operating Cost	0.36	0.37	0.37	0.37	0.38	0.37	0.38
Capital Financing Cost	1.04	1.06	1.08	1.10	1.12	1.15	1.17
Total Operating Impact	1.40	1.43	1.45	1.48	1.50	1.52	1.55

* Revenues exclude Municipal Grant Revenue and expenses exclude capital financing costs. All figures in 2016$ and include inflation at 2% per year.

The NDA will be eligible to apply through the January 2020 intake for capital grant funding through the Airports Capital Assistance Program (ACAP), administered by Transport Canada. This program recognizes that regional airports play an essential role in Canada's air transportation sector, and provides funding for projects that improve regional airport safety, protect airport assets (such as equipment and runways), and reduce operating costs. The NDA has the most future potential as a Regional asset and would have a long term objective of self-sustaining operations with the correct balance of airport services.

Niagara Central Dorothy Rungeling Airport

The NCDRA is a registered aerodrome with a history dating back to 1941. The capital costs were forecasted to be $14.6M to 2037 ($2016), with $7.2M of this cost required by 2021. Annual funding support, including capital financing, for the airport was estimated at $0.84M ($2017). This compared to the 2016 total municipal support of $0.09M. The original TSC 13-2016 report recommendation was for continued Local Municipal Governance. If the Region assumes the full cost, the $0.84M would require the equivalent of a 0.2% increase to the 2019 approved Regional levy. The increase may be mitigated through ongoing municipal contributions or reductions in the local levy in Pelham, Port Colborne, Wainfleet and Welland to offset a portion of the total costs.

Table 3: Niagara Central Dorothy Rungeling Airport estimated annual operating budget – Base Case Scenario

million $	2019	2020	2021	2022	2023	2024	2025
Net Operating Cost	0.05	0.05	0.05	0.04	0.05	0.05	0.04
Capital Financing Cost	0.79	0.80	0.82	0.84	0.85	0.87	0.89
Total Operating Impact	0.84	0.86	0.86	0.88	0.90	0.91	0.93

* Revenues exclude Municipal Grant Revenue and expenses exclude capital financing costs. All figures in 2017$ and include inflation at 2% per year.

As the outlined financial implications are based on the information from the 2016 reports and have not adjusted for any capital improvements which may have been done over the last 3 years. The revised financial implications of transferring ownership from the current owners/operators of both the NDA and the NCDRA will be brought forward to Council as part of the final decision on whether or not Niagara Region takes on sole-responsibility of both airports. It is anticipated that the revised financial estimates and options will be made available to Council in a timeframe that will align with the 2020 Regional budget process.

Analysis

Airports as an Economic and Development Asset

Generally, airports are considered to be economic assets which provide community benefit by supporting economic competitiveness and connectivity. Airports support both economic growth through areas such as business development and tourism activities; as well as population and income growth. With the proper investment and strategic vision, the NDA and NCDRA have opportunity to grow this community benefit to a regional level.

It is noted that both airports have land assets which can be leveraged to support on-site airport-related development and employment opportunities. The Region's economic development strategy supports developing the airports and surrounding land to maximize economic impact. A request for proposals (RFP) has been released to contract consulting services to explore business models for the airports that will have the greatest economic benefit to the region.

Partnerships with the Region's hospitality industry and wineries will be essential to support the success and maximize economic impact. For this reason a coordinated dialogue should be initiated forthwith to advance those partnerships.

Niagara District Airport (NDA)

The NDA is a certified airport and is owned and operated through a partnership between the town of Niagara on the Lake, and the cities of St. Catharines and Niagara Falls. On-site services include charters, helicopter & fixed-wing sightseeing, an

approved maintenance operator, flight training, and manufacturing of aerospace and aircraft components.

The NDA is compliant with International Civil Aviation Organization (ICAO) standards, which is a specialized agency of the United Nations that ensures internationally standardized safety regulations. A Nav Canada Flight Service Station is onsite, and is recognized as a Canadian Border Service Agency (CBSA) Airport of Entry (AOE), with customs and immigration services available for incoming flights. Additionally, the airport can accommodate night and inclement weather operations with high intensity LED runway lighting.

The most recent economic impact study undertaken for the NDA estimated an annual impact of $18M resulting from activity that occurred at the airport. The largest driver of employment and spending at the airport related to the manufacturing, repair and overhaul undertaken by Genaire.

The NDA, as a certified airport, is part of the Southern Ontario Airport Network (SOAN). Toronto's Pearson airport will reach capacity by 2032, and surrounding airports have partnered up with Pearson to work together to ready themselves to take on the excess capacity: Billy Bishop, Hamilton, Kingston, London, Niagara, Oshawa, Peterborough, Simcoe (Barrie), Waterloo, Windsor. By working together, Southern Ontario airports will be in a better position to support local economic development, and in doing so, increase the competitiveness of those in the partnership. As a member of this partnership, NDA has the potential to leverage these future opportunities to further the region-wide benefit for Niagara.

Niagara Central Dorothy Rungeling Airport (NCDRA)

The NCDRA is a registered aerodrome that is owned and operated through a partnership between the cities of Welland and Port Colborne, the town of Pelham, and the township of Wainfleet. On-site activities include skydiving, flight training, aircraft repair & maintenance, and a cadet program.

An economic impact study was undertaken in 2014 for the NCDRA, which estimated the annual economic impact of $4.5M per year (i.e. direct, indirect and induced spending). The primary driver of the economic impact was the Niagara Skydive Centre, as they contribute to both the direct expenditures that occur at the airport, as well as the indirect expenditures estimated for the visitors to the airport each year.

Transfer of Responsibility of NDA and NCDRA to Niagara Region

In 2016, Regional staff conducted an extensive overview of the Region's role in the operation and ownership of both NDA and NCDRA. The recommendations from staff following this review was to participate in a joint ownership role with local municipal

owners for the NDA based on the regional benefits derived from airport activity (in addition to local benefits), and the airport's long-term ability to explore opportunities that could advance Regional Council's strategic priorities. The recommendations from staff on the NCDRA identified that although some degree of regional benefit is recognized (in addition to the local benefits), given the significant costs relative to those benefits, and the fact that the airport is considered limited in its future opportunities and ability to advance Regional Council's strategic priorities, a Regional role in governance was not recommended. As part of the 2016 work, public consultation was conducted to get an understanding of the public's perceptions and ideas around the future opportunities of the two airports. Three public open houses and an online survey resulted in a total of 613 respondents. Respondents were favourable towards a justification for a Regional role based on the current and potential future role of the airports.

With these recommendations in mind, Regional Council approved a motion that the Region support in principal, pursuit of sole ownership of both airports, and directed that both airports complete a Phase 2 Environmental Assessment (EA). The results of the EAs have indicated that was soil and groundwater contamination identified for both airports. The consultant recommendations regarding contamination at NDA included additional soil sampling and monitoring of wells. It was noted that exceedances in groundwater may be naturally occurring or related to road salting practices. The consultant recommendations regarding contamination at NCDRA included additional soil sampling to estimate a remediation area, if the operator elects to complete a remediation of the metal-impacted soils. It was noted that metals in groundwater may be naturally occurring.

Based on Council's motion, and the completion of these EAs, staff will begin negotiations to transition responsibility of the two airports to Niagara Region, the results of which will be brought back to Regional Council for consideration. It is the understanding of staff that the commissions and owners of both airports are in favour of the Region pursuing sole-responsibility.

Next Steps

Attached in Appendix 1 of this report is an action plan that outlines the activities required to transfer responsibility of the NDA and NCDRA to Niagara Region. During the implementation of this action plan, Regional Council will have an opportunity to review the proposed Terms of Transfer, Operational and Capital Budget impacts, and recommended Governance and Administrative models before final approval is made to transfer ownership solely to Niagara Region.

Upon approval of the Action Plan, staff will work to complete the tasks outlined. As part of this, a Taskforce will be established to inform the terms of transfer negotiations and governance model review. The Taskforce will be made up of two (2) CAOs from the current funding municipalities from the NDA; two (2) CAOs from the current funding

municipalities from the NCDRA; two (2) CAOs from municipalities who are not currently funding partners of either airport; and Niagara Region's CAO, Commissioner of Enterprise Resource Management Services and Commissioner of Planning and Development Services. The Taskforce will be provided support from staff as required to address the terms of transfer and governance model development.

Staff will work to prepare the capital and operating budget scenarios, and it is anticipated that budget options will be brought forward for Council's consideration in alignment with the Region's 2020 budgeting process. Budget options will include short and long term financial outlooks and will outline the expected incremental budget impacts required should the Region move forward with ownership and operation of the airports.

Alternatives Reviewed

Should Regional Council decide not to continue pursuit of sole-responsibility of one or both the NDA and the NCDRA, responsibility would remain with the current owner/operator municipalities.

Relationship to Council Strategic Priorities

Not applicable at this time.

Other Pertinent Reports

- TSC-C 12-2016
- TSC-C 12-2016
- PWC-C 22-2016
- PWC-C 23-2016

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This report was prepared with financial input from Heather Talbot, Financial and Special Projects Consultant; and with input from Rino Mostacci, Commissioner of Planning and Development, and Valerie Kuhns, Director of Economic Development; and in consultation with Helen Chamberlain, Director of Financial Management & Planning / Deputy Treasurer.

Appendices

Appendix 1	Airport Project Action Plan
Appendix 2	Airport Project Timeline
Appendix 3	NDA Phase II Environmental Assessment Report
Appendix 4	NCDRA Phase II Environmental Assessment Report

Airport Project Action Plan

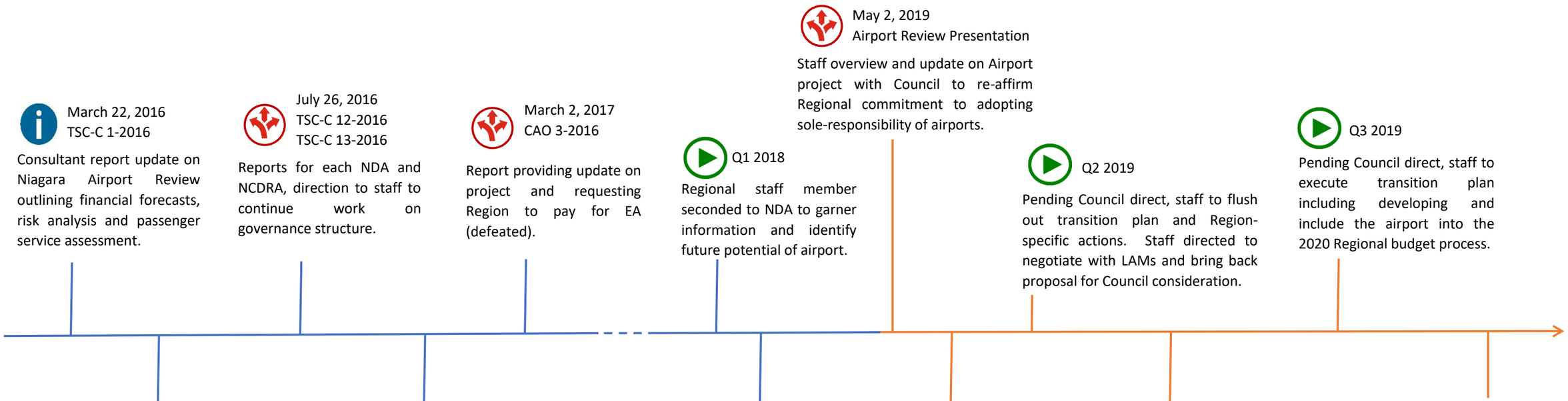
2019

- Regional Council commitment to pursue sole Regional ownership through the approval of the Action Plan
- An Airport Taskforce to be established to provide direction through the Terms of Transfer negotiation and development of the Governance Model
- A cross-functional staff working group has been established to define the transition plan
- Business Model Study to inform future potential based on assets of each airport, commissioned through the Economic Development Division
- Staff to negotiate the Terms of Transfer of both airports to the Region through the Airport Taskforce
- The Terms of Transfer are brought back to Regional Council for direction and approval
- Staff to develop a Transition Plan for Council consideration:
    - Preparation of Capital and Operating budget options with a review of long term financial investment requirements
    - Governance model recommendations based on sole Regional ownership
    - Administrative management model for the operations of both airports
- Capital and Operational Budgets brought forward for Council consideration through Regional budget planning process
- Recommended Governance and Administrative Models brought to Council for final approval

2020

- Upon Council endorsement of the finalized Operating and Capital Budgets, Governance and Administrative Models, staff will execute the Transition Plan bringing both airports to Regional operation

Airport Project Timeline



March 22, 2016
TSC-C 1-2016

Consultant report update on Niagara Airport Review outlining financial forecasts, risk analysis and passenger service assessment.

July 26, 2016
TSC-C 12-2016
TSC-C 13-2016

Reports for each NDA and NCDRA, direction to staff to continue work on governance structure.

March 2, 2017
CAO 3-2016

Report providing update on project and requesting Region to pay for EA (defeated).

Q1 2018

Regional staff member seconded to NDA to garner information and identify future potential of airport.

May 2, 2019
Airport Review Presentation

Staff overview and update on Airport project with Council to re-affirm Regional commitment to adopting sole-responsibility of airports.

Q2 2019

Pending Council direct, staff to flush out transition plan and Region-specific actions. Staff directed to negotiate with LAMs and bring back proposal for Council consideration.

Q3 2019

Pending Council direct, staff to execute transition plan including developing and include the airport into the 2020 Regional budget process.

May 3, 2016
Airport Review Presentation

Staff presentation outlining next steps on the consultant review.

September 15, 2016
PWC-C 23-2016

Regional Council supports in principle, adopting sole responsibility for both operations and governance of airports pending Environmental Assessments (EAs) as paid for by current owners.

Motions were also approved that negotiations with current funding partners and transition plan (transitional funding and proposed new governance structure) be developed.

Q2 2018

Environmental Assessments for both NDA and NCDRA completed.

Q2 2019

Airport Business Model Study & review of potential future usage of both airports conducted to inform future capital investments and transition planning

July / August, 2019
Airport Decision Point

Staff to bring back recommendation and terms of adopting sole Regional operation and governance of both airports for Council

Q2 2020

Staff completes transition, Region adopts operation and governance of NDA and NCDRA airports.

Council Information / Touchpoint

Council Decision Point

Staff Action

CAO 04-2019
Appendix 3
Niagara District Airport
Phase II Environmental Assessment Report

NIAGARA DISTRICT AIRPORT

PHASE II ENVIRONMENTAL SITE ASSESSMENT

NIAGARA DISTRICT AIRPORT, 468 NIAGARA STONE ROAD, NIAGARA-ON-THE-LAKE

OCTOBER 11, 2017

PHASE II ENVIRONMENTAL SITE ASSESSMENT

NIAGARA DISTRICT AIRPORT, 468 NIAGARA STONE ROAD, NIAGARA-ON-THE-LAKE

NIAGARA DISTRICT AIRPORT

ENVIRONMENTAL SITE ASSESSMENT REPORT

PROJECT NO.: 171-08598-00 - 002
DATE: OCTOBER 11, 2017

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October 11, 2017

Len O Connor, CEO
Niagara District Airport
468 Niagara Stone Road
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E-mail: loconnor@niagaradistrictairport.ca

Subject: **Phase II Environmental Site Assessment**
Niagara District Airport
468 Niagara Stone Road, Niagara-on-the-Lake, Ontario
Our Project # 171-08598-00 - 002

Dear Sir,

WSP Canada Inc. is pleased to provide our report documenting the findings of the Phase II Environmental Site Assessment (ESA) completed at the above-noted property.

The assessment was completed in general compliance with the Canadian Standards Association (CSA) Standard Z769-00 Phase II Environmental Site Assessment. The report describes the interpreted environmental conditions at the Site and provides conclusions for your consideration. It is understood that filing of a Record of Site Condition in accordance with Ontario Regulation 153/04 is not required for the subject property at this time.

We trust that this information is sufficient for your current needs. If you have any questions or require further information, please contact the undersigned.

Yours truly,

Rachel Bryan, M.A.Sc., P.Eng.
Project Engineer, Environment

David A. MacGillivray, M.A.Sc., P.Geo., P.Eng.
Senior Engineer, Environment

WSP ref.: 171-08598-00 - 002

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This report was prepared by WSP Canada Inc. (WSP) for the account of Niagara District Airport, in accordance with our proposal dated May 24, 2017. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP's best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

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1 EXECUTIVE SUMMARY

WSP was retained by Niagara District Airport (NDA) to conduct a Phase II Environmental Site Assessment (ESA) for the NDA property located at 468 Niagara Stone Road, Niagara-on-the-Lake, Ontario, herein referred to as the 'Site'. The Site consists of approximately 130 hectares (322 acres) of land on the north side of Niagara Stone Road (Highway 55), in the Town of Niagara-on-the-Lake, Ontario. The Site is situated approximately 1. 6 km east of the City of St. Catharines in an agricultural and rural residential area. The Site operates as a municipal airport including three runways, four taxiways, a terminal apron, terminal building, several aircraft hangars, maintenance facilities, and a refuelling area.

A Phase I ESA was recently completed by WSP for the Site for due diligence purposes prior to the potential sale of the property. The Phase I ESA recommended that a Phase II ESA was required to investigate soil and groundwater conditions in ten areas of potential environmental concern (APECs) identified on the Site. Contaminants of potential concern in soil and groundwater included petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), metals and inorganics, polychlorinated biphenyls (PCBs), and perfluoroalkylated substances (PFAS).

Intrusive soil sampling through the advancement of boreholes and groundwater sampling from pre-existing and newly installed monitoring wells were used to investigate the subsurface conditions at the Site. A total of 12 boreholes were advanced on the Site; seven were completed as monitoring wells. One pre-existing monitoring well was also sampled to assess groundwater quality in the fuel storage area.

The boreholes were advanced through a surface layer of either topsoil, sand and gravel, fill, or asphalt. Native silty clay to clayey silt glacial till (Halton Till) was encountered beneath the surface layer. The Halton Till unit extended to the maximum drilling depth of 7.6 mbgs. Regional geological mapping shows bedrock in the area consists of red shale of the Queenston Formation. The overburden drift thickness at the Site is estimated to range from approximately 21 to 30 m.

Shallow groundwater is present within the Halton Till and the inferred groundwater flow direction is to the north towards Lake Ontario.

A total of 25 soil samples and 11 groundwater samples (including duplicates) were submitted for laboratory analysis of contaminants of concern. Analytical results were compared to the Ministry of the Environment and Climate Change (MOECC) Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Industrial/Commercial/Community Property Use with medium and fine textured soils as outlined in the *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (April 15, 2011), hereinafter referred to as the "Table 2 SCS".

Based on the results of the investigation, the following parameter exceedances were observed in the submitted soil and groundwater samples:

Soil

- Samples 17-01 S2 and 17-05 S2 exceeded the applicable Table 2 SCS for conductivity.

Groundwater

- Samples 17-01, 17-06 and 12-1 exceeded the applicable Table 2 SCS for cobalt;
- Samples 17-01, 17-10 and 12-1 exceeded the applicable Table 2 SCS for sodium;
- Sample 17-06 exceeded the applicable Table 2 SCS for selenium; and,
- Samples 17-01, 17-02, 17-05, 17-06, 17-10, 17-11 and 12-1 exceeded the applicable Table 2 SCS for uranium.

Based on the work completed, soil and groundwater quality on the Site do not meet the applicable Table 2 SCS. We note that proposed amendments to O. Reg. 153/04 may eliminate the need to address exceedances for conductivity in soil and sodium in groundwater related to the use of road salt.

The following recommendations are provided for your consideration:

- Additional soil sampling is recommended to characterize the imported fill material within APEC 9.
- The monitoring wells should be re-sampled to confirm the exceedances noted at the Site. We note that the exceedances in groundwater may be naturally occurring or related to road salting practices.
- The monitoring wells at the Site should be maintained in accordance with O. Reg. 903. If they are no longer in use, the monitoring wells should be decommissioned by a licenced well contractor in accordance with O. Reg. 903.

2 INTRODUCTION

2.1 INTRODUCTION

WSP was retained by Niagara District Airport (NDA) to conduct a Phase II Environmental Site Assessment (ESA) for the NDA property located at 468 Niagara Stone Road, Niagara-on-the-Lake, Ontario, herein referred to as the 'Site'. The Site consists of approximately 130 hectares (322 acres) of land on the north side of Niagara Stone Road (Highway 55), in the Town of Niagara-on-the-Lake, Ontario. The Site is situated approximately 1. 6 km east of the City of St. Catharines in an agricultural and rural residential area. The Site operates as a municipal airport including three runways, four taxiways, a terminal apron, terminal building, several aircraft hangars, maintenance facilities, and a refuelling area. The remainder of the NDA land is mainly vegetated with grasses, with minimal cultural meadow and thicket habitats. The vegetated area is regularly mowed and maintained as part of the standard airport operations. A Site location map is provided as Figure 1 and site features are shown on the Site Plan provided as Figure 2.

A Phase I ESA was recently completed by WSP for the Site (dated October 10, 2017) for due diligence purposes prior to the potential sale of the property. The Phase I ESA recommended that a Phase II ESA was required to investigate soil and groundwater conditions in ten areas of potential environmental concern (APECs) identified on the Site.

The Phase II ESA has been completed in general accordance with the Canadian Standards Association (CSA) Standard Z769-00, Phase II Environmental Site Assessment. This report has not been prepared to support a Record of Site Condition application for the Site.

2.2 BACKGROUND

A previous Phase I ESA identified ten APECs on the Site, as follows:

APEC	LOCATION OF APEC ON PROPERTY	CONTRIBUTING PCAS	CONTAMINANTS OF POTENTIAL CONCERN	MEDIA POTENTIALLY IMPACTED
1	Majority of Site	3. Airstrips and Hangars Operation	M&I PAHs PHCs VOCs	Soil and Groundwater
2	Vicinity of Building #11	24. Fire Training 34. Metal Fabrication	M&I PAHs PCBs PFAS PHCs VOCs	Soil and Groundwater
3	Refuelling Area	28. Gasoline and Associated Products Storage in Fixed Tanks	PHCs BTEX lead	Soil and Groundwater
4	East of refuelling area	30. Importation of Fill Material of Unknown Quality	M&I PAHs PCBs PHCs VOCs	Soil and Groundwater

APEC	LOCATION OF APEC ON PROPERTY	CONTRIBUTING PCAS	CONTAMINANTS OF POTENTIAL CONCERN	MEDIA POTENTIALLY IMPACTED
5	Southwest of Building # 2	30. Importation of Fill Material of Unknown Quality	M&I PAHs PCBs PHCs VOCs	Soil and Groundwater
6	Vicinity of Building #1	7. Boat Manufacturing	M&I PHCs VOCs	Soil and Groundwater
7	Former refuelling area, east of Building #1	28. Gasoline and Associated Products Storage in Fixed Tanks	PHCs BTEX lead	Soil and Groundwater
8	Vicinity of Building #6	27. Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	M&I PHCs VOCs	Soil and Groundwater
9	Eastern portion of the Site on the south side of Runway 06-24	30. Importation of Fill Material of Unknown Quality	M&I PAHs PCBs PHCs VOCs	Soil and Groundwater
10	East of Building #11	28. Gasoline and Associated Products Storage in Fixed Tanks	PHCs BTEX	Soil and Groundwater

Notes:
PHCs – Petroleum hydrocarbons
BTEX – Benzene, toluene, ethylbenzene, xylenes
VOCs – Volatile organic compounds
PAHs – Polycyclic aromatic hydrocarbons
M&I – Metals and inorganic parameters
PCBs – Polychlorinated Biphenyls
PFAS – Perfluoroalkylated substances

2.3 CURRENT AND PROPOSED LAND USE

The Site currently operates as a municipal airport, which is considered an industrial land use under Ontario Regulation 153/04. We are not aware of any proposed change in land use at the Site.

2.4 SCOPE OF WORK

In general, the purpose of the Phase II ESA is to assess the subsurface soil and groundwater conditions at the Site in the ten APECs identified in the previous Phase I ESA.

The scope of work included the advancement of 12 boreholes and the installation of monitoring wells in seven of the boreholes on the Site. Drilling locations and APECs are shown on the site plan provided as Figure 3.

Monitoring wells 12-1 and 12-2, which were installed by Golder Associates in 2012 and are located within APEC 3, were also included in the monitoring program. Groundwater elevations were measured in both wells, and a sample was collected from well 12-1 and submitted for laboratory analysis.

2.5 APPLICABLE SITE CONDITION STANDARD

Analytical results were compared to the Ministry of the Environment and Climate Change (MOECC) Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for Industrial/Commercial/Community Property Use with medium and fine textured soils, as outlined in the *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (April 15, 2011), hereinafter referred to as the "Table 2 SCS". This evaluation standard for the Site was selected for comparison purposes based on the following:

- Six active water supply wells were identified within 250 m of the Site boundaries in the MOECC well records online database. The wells are used for domestic and livestock supply;
- The Site is currently developed for industrial use and there is no proposed change in land use;
- The nearest surface water course is a tributary of Eight Mile Creek and is located approximately 90 m north of the northwest corner of the Site. Several drainage ditches are located around the perimeter and through the center of the Site; however, these drains were constructed for storm water management and are not considered to be permanent water courses;
- The pH values reported from analysis of soil samples collected from the Site ranged from 7.32 to 7.91. These values were within the acceptable range to use the Table 2 SCS;
- Areas of natural significance were not identified on the Site or within 30 m of the Site boundaries; and,
- The Site is not considered to be a shallow soil property, as defined by O. Reg. 153/04.

3 PHASE II INVESTIGATION METHOD

3.1 GENERAL

Subsurface soil sampling and groundwater sampling from the boreholes advanced and the monitoring wells installed as part of the drilling investigation were used to investigate the subsurface conditions at the Site. Details of the investigation are described in the following sections. Drilling, soil sampling, and monitoring well installation activities were supervised by WSP field personnel. Field notes were recorded in a dedicated field book, which is retained on file.

The borehole/monitoring well locations are depicted on the Site Plans provided as Figures 2 and 3.

3.2 UTILITY LOCATES

Ontario One Call was contacted for the public utilities locates for the investigation. Buffalo Locating Inc. was retained by WSP to locate private utilities on-Site for the borehole locations included in the subsurface investigation work.

3.3 DRILLING

The drilling program was completed on July 7 and 10, 2017. Twelve (12) boreholes were advanced on the Site and monitoring wells were installed in seven of the boreholes to allow for groundwater sampling. Boreholes were advanced using a Geoprobe 7822 DT track-mounted drill rig provided by Landshark Drilling. The boreholes were advanced using the direct push method to a depth of 6.1 mbgs with the exception of 17-11, which was advanced to 7.6 mbgs. Seven of the boreholes were then drilled using 108-mm solid stem augers to facilitate the installation of monitoring wells. The remaining five boreholes were backfilled with bentonite pellets to surface.

3.4 SOIL SAMPLING

Continuous direct push soil sampling was conducted using a 32-mm diameter, 1.5-m long stainless steel continuous sampler equipped with disposable PVC liners.

Disposable nitrile gloves were used during sample collection to minimize the potential for cross-contamination. Soil samples were described in the field by WSP staff, and observations were recorded in a dedicated field book. Soil samples selected for chemical analysis were stored at a temperature of less than 10°C and handled under standard chain of custody procedures until received at the laboratory. The soil samples selected for laboratory submission were considered to be representative of worst-case conditions in the boreholes based on field screening results, the location of the APECs, and observations of olfactory and visual characteristics, if any.

A total of 25 soil samples, including six blind field duplicates, were submitted to the laboratory for chemical analysis, as summarized in the following table:

Table 3-1 Soil Samples Submitted for Chemical Analysis

SAMPLE ID	DEPTH (mbgs)	LABORATORY ANALYSES
17-01 S2 and duplicate 17-01 S20	0.76 - 1.52	PAHs, M&I
17-01 S5 and duplicate 17-01 S50	3.05 - 3.81	PHCs, VOCs
17-02 S2 and duplicate 17-02 S20 (PCBs only)	0.76 - 1.52	PAHs, M&I, PCBs
17-02 S8 and duplicate 17-02 S80 (PFAS only)	5.33 - 6.10	PHCs, VOCs, PFAS

SAMPLE ID	DEPTH (mbgs)	LABORATORY ANALYSES
17-03 S5	3.05 - 3.81	PHCs, VOCs, M&I
17-04 S1	0.00 - 0.76	M&I, PCBs
17-05 S2 and duplicate 17-05 S20 (M&I only)	0.76 - 1.52	PAHs, M&I
17-05 S3 and duplicate 17-05 S30 (PHCs and BTEX only)	3.05 - 3.81	PHCs, VOCs
17-06 S5	3.05 - 3.81	PHCs, BTEX, M&I
17-07 S4	2.29 - 3.05	PHCs, BTEX, M&I
17-08 S1	0.00 - 0.76	PHCs, VOCs, PAHs, M&I, PCBs
17-09 S2	0.76 - 1.52	PAHs, M&I
17-09 S7	4.57 - 5.33	PHCs, VOCs
17-10 S1	0.00 - 0.76	PAHs, M&I
17-10 S3	3.05 - 3.81	VOCs
17-10 S7	4.57 - 5.33	PHCs, BTEX
17-11 S2	0.76 - 1.52	PHCs, VOCs, PAHs, M&I, PCBs
17-12 S1	0.00 - 0.76	PAHs, PCBs
17-12 S2	0.76 - 1.52	PHCs, VOCs, M&I

3.5 FIELD SCREENING MEASUREMENTS

Soil samples collected from the boreholes were field screened for total organic vapours (TOV) using a photoionization detector calibrated to isobutylene. The TOV measurements are presented on the borehole logs included in Appendix A.

The field screening results showed generally low TOV readings in the boreholes, ranging from 0 to 5 ppm. Two samples (17-05 S3 and 17-10 S3) showed TOV readings above 20 ppm. These samples were submitted for laboratory analysis of VOCs.

3.6 GROUNDWATER MONITORING WELL INSTALLATION

Groundwater monitoring wells were installed on June 7 and 10, 2017 in seven of the boreholes advanced on the Site. Nitrile gloves were used to handle the well casings to minimize the potential for contamination during installation.

The monitoring wells were constructed using 51 mm Schedule 40 PVC risers and included a 3-m well screen (slot 10). Sand packs were placed in the annular space within the boreholes around the well screens from the bottom of the wells to approximately 0.3 m above the well screens. Bentonite hole plug seals were placed above the sand packs to a depth of 0.3 mbgs. The wells were completed with protective metal casings. The monitoring well construction details are shown on the borehole logs provided as Appendix A.

The monitoring wells were equipped with dedicated 4.3-mm inner diameter LDPE tubing and 4.8-mm inner diameter silicone tubing to facilitate well development and sampling with a peristaltic pump.

The monitoring wells installed at the Site need to be maintained in accordance with the Ontario Water Resources Act, O. Reg. 903. Once the wells are no longer required for monitoring or sampling purposes, these wells will need to be appropriately decommissioned by a licensed well contractor as required by O. Reg. 903.

3.7 GROUNDWATER SAMPLING

Groundwater samples were collected on July 24 and 25, 2017 from each of the seven newly-installed monitoring wells as well as pre-existing monitoring well 12-1. Groundwater sampling was conducted by low-flow sampling techniques using a peristaltic pump using ASTM D6771: Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations, as a general guide. The samples were collected directly into laboratory-supplied bottles, containing preservative where required, stored on ice and submitted under standard chain of custody procedures to the laboratory. Vials used for VOC/BTEX and PHC F1 analysis were filled to achieve zero headspace.

A total of 11 groundwater samples, including three blind field duplicate samples, were submitted to the laboratory for chemical analysis, as summarized in the following table:

Table 3-2 Groundwater Samples Submitted for Chemical Analysis

SAMPLE ID	LABORATORY ANALYSES
17-01	PHCs, VOCs, PAHs, M&I
17-02 and duplicate MW300 (PFAS only)	PHCs, VOCs, PAHs, M&I, PCBs, PFAS
17-03 and duplicate MW200 (PAHs and PCBs only)	PHCs, VOCs, PAHs, M&I, PCBs
17-05	PHCs, VOCs, M&I
17-06	PHCs, BTEX, M&I
17-10 and duplicate MW100	PHCs, VOCs, M&I
17-11	PHCs, VOCs, PAHs, M&I, PCBs
12-1	PHCs, BTEX, M&I

3.8 GROUNDWATER: FIELD MEASUREMENT OF WATER QUALITY PARAMETERS

The field groundwater quality measurements were obtained during low flow sampling. A YSI 556 multi-parameter flow-through cell was used to measure pH, conductivity, redox potential, dissolved oxygen and temperature in the field during low flow sampling. All measurements were recorded in the project field book, which is maintained on file. The groundwater samples collected were described as either clear and colourless or cloudy and brown with no odour detected or visible sheen.

3.9 ANALYTICAL TESTING

PFAS analysis was completed by ALS laboratory in Waterloo, Ontario.

All other laboratory analyses were completed by Maxxam Analytics (Maxxam) in Mississauga, Ontario.

ALS and Maxxam are certified by the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation Inc. (CALA).

3.10 SURVEYING

Ground surface and top of pipe elevations and UTM coordinates of the monitoring wells and borehole locations were surveyed by WSP personnel using a Sokkia Network GCX2 Rover GPS unit on July 12, 2017.

4 PHASE II REVIEW AND EVALUATION

4.1 GEOLOGY

A brief summary of the subsurface conditions encountered at the Site is presented below. Detailed borehole logs are included in Appendix A.

The boreholes were advanced through a surface layer of either topsoil (17-01, 17-04, 17-05, 17-06, 17-07, 17-08, and 17-10), sand and gravel (17-02 and 17-03), fill (17-11 and 17-12), or asphalt (17-09). Native silty clay to clayey silt glacial till (Halton Till) was encountered beneath the surface layer. The Halton Till unit extended to the maximum drilling depth of 7.6 mbgs.

Regional geological mapping shows bedrock in the area consists of red shale of the Queenston Formation. The overburden drift thickness at the Site is estimated to range from approximately 21 to 30 m.

4.2 GROUNDWATER ELEVATIONS AND FLOW DIRECTION

Groundwater elevations were measured in the monitoring wells on July 24, 2017. The groundwater elevations and depths are summarized in the following table and presented on Figure 4. We note that the water levels measured in 17-02 and 17-06 were still rising and the reported levels in these wells do not represent static conditions.

Table 4-1 July 24, 2017 Groundwater Elevations

MONITORING WELL ID	TOP OF PIPE ELEVATION (mASL)	GROUND SURFACE ELEVATION (mASL)	DEPTH TO GROUNDWATER (mBGS)	GROUNDWATER ELEVATION (mASL)
17-01	98.713	97.83	1.88	95.95
17-02	98.567	97.64	3.94*	93.71
17-03	97.631	97.72	0.61	97.11
17-05	98.798	97.82	0.87	96.95
17-06	97.528	97.61	5.76*	91.86
17-10	98.761	97.77	2.22	95.55
17-11	97.632	96.72	0.98	95.74
12-1	97.468	97.67	0.56	97.11
12-2	97.107	97.36	0.47	96.89

Notes:
* value does not represent the static water level at this location.

Based on the topography of the Site, the direction of shallow groundwater flow is inferred to be to the north.

4.3 SOIL QUALITY

Laboratory analysis results for the submitted soil samples are summarized in the attached Table 1. Laboratory Certificates of Analysis are provided in Appendix B.

The following table summarizes the parameters that exceeded the applicable Table 2 SCS in the submitted soil samples. The exceedances are also depicted on Figure 5.

Table 4-2 Summary of Parameter Exceedances in Soil

SAMPLE ID	PARAMETER	UNITS	TABLE 2 SCS	MEASURED VALUE
17-01 S2	Conductivity	mS/cm	1.4	2
17-05 S2	Conductivity	mS/cm	1.4	2.3

4.4 GROUNDWATER QUALITY

Laboratory analysis results for the submitted groundwater samples are summarized in the attached Table 2. Laboratory Certificates of Analysis are provided in Appendix B.

The following table summarizes the parameters that exceeded the applicable Table 2 SCS in the submitted groundwater samples. The exceedances are also depicted on Figure 6.

Table 4-3 Summary of Parameter Exceedances in Groundwater

SAMPLE ID	PARAMETER	UNITS	TABLE 8 SCS	MEASURED VALUE
17-01	Cobalt Sodium Uranium	µg/L µg/L µg/L	3.8 490000 20	13 590000 69
17-02	Uranium	µg/L	20	55
17-05	Uranium	µg/L	20	69
17-06	Cobalt Selenium Uranium	µg/L µg/L µg/L	3.8 10 20	7.4 20 59
17-10	Sodium Uranium	µg/L µg/L	490000 20	680000 85
17-11	Uranium	µg/L	20	31
12-1	Cobalt Sodium Uranium	µg/L µg/L µg/L	3.8 490000 20	32 740000 100

4.5 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Six blind duplicate soil samples and three blind duplicate groundwater samples were submitted for laboratory analysis. The calculated RPDs were assessed against the recommended performance criteria outlined in the 2011 Protocol.

The soil results indicated acceptable correlation between duplicate samples with the following exceptions:

— Barium concentrations of 100 and 180 µg/g were measured in duplicate samples 17-01 S2 and 17-01 S20 (RPD = 57%). Given that the barium concentration was below the applicable Table 2 SCS in both samples, it can be concluded with a reasonable level of confidence that the concentration of barium in soil at this location met the applicable Table 2 SCS despite some variability.

— Conductivity values of 2.3 and 0.94 mS/cm were measured in duplicate samples 17-05 S2 and 17-05 S20 (RPD = 84%). The applicable Table 2 SCS for conductivity is 1.4 µg/g. In this case, there is disagreement between the duplicate

samples as to whether the soil meets the applicable standard. For the purposes of this due diligence assessment we have considered this sample to exceed the Table 2 SCS.

The groundwater results indicated acceptable correlation between duplicate samples, and were therefore suitable for interpretation.

A trip blank (distilled water sample), prepared by the laboratory, travelled along with the groundwater samples and was analyzed by the laboratory for VOCs. All concentrations were below the RDL, indicating no contamination from the sample containers, preservatives, and transportation and storage conditions. The results also indicate that the laboratory instrument was not detecting false interference.

ALS and Maxxam also carried out internal QA/QC measures including process recoveries, blanks, and replicate samples. The laboratory QA/QC results are provided on the Certificates of Analysis in Appendix B. The results were acceptable and therefore suitable for interpretation.

5 DISCUSSION AND CONCLUSIONS

Based on the results of the investigation, the following conclusions are presented:

- Native soil at the Site consists of silty clay to clayey silt glacial till (Halton Till). The boreholes were terminated within the Halton Till unit at depths of 6.1 mbgs or 7.6 mbgs.
- At boreholes 17-11 and 17-12, 1.5 m and 2.4 m of imported fill material was observed overlying the native soil.
- Shallow groundwater was measured between depths of 0.47 and 5.76 mbgs and the groundwater flow direction is inferred to be to the north towards Lake Ontario.

Soil Quality

- The submitted soil samples met the applicable Table 2 SCS for the contaminants of concern with the exception the following two samples:
  - Samples 17-01 S2 and 17-05 S2, collected at a depth of 0.76 to 1.52 mbgs, exceeded the applicable Table 2 SCS for conductivity. These boreholes were located within APEC 1 (airstrips and hangars) and APEC 6 (boat manufacturing). The conductivity exceedances in these samples may be related to these activities or road salting practices.

Groundwater Quality

- Seven of the eight groundwater samples submitted for laboratory analysis exceeded the Table 2 SCS for one or more parameters. The following analysis and interpretation of the exceedances is provided:
  - Samples 17-01, 17-06 and 12-1 exceeded the applicable Table 2 SCS for cobalt. These wells are located on the south side of the Site, spread over a distance of approximately 590 m. The source of elevated cobalt in the groundwater is not known; it may be naturally occurring, or it may be an anthropogenic source such as aircraft and truck exhaust or industrial processes.
  - Samples 17-01, 17-10 and 12-1 exceeded the applicable Table 2 SCS for sodium. These wells are located on the south side of the Site, spread over a distance of approximately 630 m. The elevated sodium in groundwater may be caused by the application of road salt to paved surfaces on and around the Site.
  - Selenium was measured at a concentration of 20 µg/L in sample 17-06, exceeding the applicable Table 2 SCS of 10 µg/L. This well is located within APEC 7 (former refuelling area). The source of elevated selenium in the groundwater at this location is not known but it may be naturally occurring. Selenium is not considered to be a contaminant of concern related to fuel storage and handling activities, which occurred at this location. We note that with the exception of well 17-02, where selenium was measured at a concentration of 2.6 µg/L, selenium was not detected in any of the other monitoring wells on-site.
  - Uranium in groundwater exceeded the applicable Table 2 SCS of 20 µg/L at seven of the eight monitoring wells, with concentrations ranging from 31 to 100 µg/L. Well 17-03 was the only location that did not exceed the applicable standard. The source of elevated uranium in the groundwater is not known; however, given its widespread distribution across the Site, and the absence of any known anthropogenic sources, it is most likely naturally-occurring due to the dissolution of uranium bearing minerals in the soil.

Based on the work completed, soil and groundwater quality on the Site do not meet the applicable Table 2 SCS. We note that proposed amendments to O. Reg. 153/04 may eliminate the need to address exceedances for conductivity in soil and sodium in groundwater related to the use of road salt.

The following recommendations are provided for your consideration:

- Additional soil sampling is recommended to characterize the imported fill material within APEC 9.
- The monitoring wells should be re-sampled to confirm the exceedances noted at the Site. We note that the exceedances in groundwater may be naturally occurring or related to road salting practices.
- The monitoring wells at the Site should be maintained in accordance with O. Reg. 903. If they are no longer in use, the monitoring wells should be decommissioned by a licenced well contractor in accordance with O. Reg. 903.

6 LIMITATIONS

This report has been prepared for the addressee. Release to any other company, concern, or individual is solely the responsibility of the addressee. WSP reserves the right to amend and/or supplement this report in the event additional information, documentation or evidence becomes available.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Any use that a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions taken, based on this report.

Conclusions presented in this report should not be construed as legal advice and represent the best technical judgment of WSP staff. The conclusions are based on the Site conditions observed by WSP at the time the work was performed at the specific testing and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the Site reflecting natural, construction and other activities. In addition, analysis has been carried out for a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, WSP cannot warrant against undiscovered environmental liabilities or adverse impacts off-Site.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions and recommendations provided herein.

7 QUALIFICATIONS OF THE ASSESSORS

Ms. Rachel Bryan, M.A.Sc., P.Eng., QP_{ESA}, is a Project Engineer in the Hamilton, Ontario office of WSP. She has experience in conducting Phase I and II Environmental Site Assessments on numerous residential, commercial, and industrial properties. Ms. Bryan also has experience in completing soil and groundwater contaminant delineation programs and is a Qualified Person (QP_{ESA}) with the MOECC under Ontario Regulation 153/04. She has also directed the implementation of soil remediation programs, verification sampling, and site restoration activities.

Mr. David A. MacGillivray, P.Eng., P.Geo., $QP_{ESA,RA}$, is the National Discipline Lead for Contaminated Lands and Environmental Site Assessments for WSP Canada. He is responsible for the operations of the environment group at WSP's Hamilton location. Mr. MacGillivray's career experience has included assignments involving Brownfields such as Phase One and Two ESAs, Record of Site Conditions, Risk Assessments, and Risk Management Plans. He has worked extensively in the area of groundwater resource development and groundwater impact assessment. Mr. MacGillivray also provides expertise in the completion of geotechnical and groundwater control studies for civil projects including subdivisions, transportation, buildings, and servicing. Mr. MacGillivray is a Qualified Person ($QP_{ESA,RA}$)with the Ministry of the Environment to complete Risk Assessments and submit Records of Site Condition under Ontario Regulation 153/04 (Brownfield Regulation).

8 BIBLIOGRAPHY

— Canadian Standards Association (CSA). July 2002. Phase II Environmental Site Assessment Standard Z769-00.

— Ministry of the Environment. 2004. Ontario Regulation 153/04 as amended by Ontario Regulation 511/09 – Records of Site Condition.

— Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the *Environmental Protection Act*. Laboratory Services Branch, Ministry of the Environment. March 9, 2004, amended as of July 1, 2011. PIBS # 4696e01

— Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act.* Ministry of the Environment. April 15, 2011. PIBS # 7382e01

CAO 04-2019
Appendix 4
Niagara Central Dorothy Rungeling Airport
Phase II Environmental Assessment Report

PHASE II ENVIRONMENTAL SITE ASSESSMENT
NIAGARA CENTRAL DOROTHY RUNGELING AIRPORT
435 RIVER ROAD
PELHAM, ONTARIO

Submitted to:

NIAGARA CENTRAL DOROTHY RUNGELING AIRPORT
435 River Road
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Submitted by:

Amec Foster Wheeler Environment & Infrastructure,
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October 11, 2017

TG171098

Distribution:

- Niagara Central Dorothy Rungeling Airport – 1 electronic copy; and
- Amec Foster Wheeler – 1 electronic copy.

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1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, a division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), was retained by Mr. Richard Rybiak of Niagara Central Dorothy Rungeling Airport (the CLIENT or NCDRA) to conduct a Phase II Environmental Site Assessment (ESA) of the property located at 435 River Road in Pelham, Ontario (the Site). A key plan showing the location of the Site is provided in **Figure 1**. At the time of the Phase II ESA, the Site was owned by an airport commission consisting of four municipalities (Pelham, Welland, Port Colborne and Wainfleet). It was occupied by NCDRA, as well as various tenants including Niagara Sky Dive Centre Inc., the Royal Canadian Air Cadets (RCAC) and various private individuals which own the eleven (11) on-Site hangars. Reportedly, these private individuals rent the land from NCDRA and can construct, own and occupy the hangar structures. In addition, farmland around the perimeters of the Site are leased to neighbouring land owners for agricultural purposes, while a small area on the south side of the Site is leased to a weather company who utilizes this area as a weather recording station. **Figure 2** illustrates the lot configuration of the Site.

The CLIENT retained Amec Foster Wheeler to provide an evaluation of known and possible environmental issues at the Site for due diligence purposes prior to potentially transitioning ownership of the Site to the Regional Municipality of Niagara (RMON).

1.1 Background

Amec Foster Wheeler completed a Phase I ESA at the Site entitled, "*Phase I Environmental Site Assessment, Niagara Central Dorothy Rungeling Airport, 435 River Road, Pelham, Ontario" (Phase I ESA) draft report* dated October 5, 2017 and prepared for the Client (reference # TG171038). There were no changes in ownership or occupancy of the Site between completion of the Phase I and II ESAs.

The following conclusions were presented in the Phase I ESA:

Based on a review of the available information sources, including discussions with the Site representatives, it appears that the Site was utilized for agricultural purposes until the early 1940s when, during the Second World War, it was developed for the purposes of training RCAF pilots. After the war, the airport continued to be utilized for the training of private pilots and soon became a recreational and commercial airport facility. At the time of the reconnaissance, the Site was owned by an airport commission consisting of four municipalities (Pelham, Welland, Port Colborne and Wainfleet). It was occupied by NCDRA, as well as various tenants including Niagara Sky Dive Centre Inc., the RCAC and various private individuals which own the eleven (11) on-Site hangars. Reportedly, these private individuals rent the land from NCDRA and can construct, own and occupy the hangar structures. In addition, farmland around the perimeters of the Site are leased to neighbouring land owners for agricultural purposes, while a small area on the south side of the Site is leased to a weather company who utilizes this area as a weather recording station.

The following potentially significant environmental issues were identified concerning the Site:

- *The Site has been utilized as an airport facility since the early 1940s. As part of this activity, it is presumed that various fuel tanks (for fueling planes and building heating purposes) and maintenance chemicals have been present on the Site. Currently, there are three (3) aboveground storage tanks (ASTs) utilized for heating fuel and two (2) underground storage tanks (USTs) utilized for aviation fuel present at the Site.*

- *Falls Aviation Limited at the Site was listed as an industrial waste generator (ON6036283) for waste oils and lubricants (waste class 252) in 2003, 2004, 2010, 2011 and 2012. This is presumed to be associated with the plane maintenance and repair operations that occur at the Site.*

- *A maintenance shop was historically present (i.e., early 1940s to early 1970s) on the south side of the Site. Discussions with the Site representatives confirmed that this was a full mechanical garage with pits utilized for the purposes of servicing vehicles.*

- *Historically, barracks, along with an incinerator (which is still present) were also located at the Site. The historic heating fuel utilized in the barracks is unknown. Additionally, it is unknown what materials were historically incinerated in the incinerator.*

- *As per discussion with the Site representatives and the Ontario Spills database, a plane collision in October 2016 resulted in 2,400 pounds of aviation fuel being spilled to the ground. Based on the ERIS report and discussions with the Site representatives, all the spilled aviation fuel was contained and properly cleaned up; however, a report detailing the clean-up activities was not provided to Amec Foster Wheeler for review.*

- *Based on the original date of construction of Hangars 1 and 3 and the pump house (i.e., early 1940s), as well as Hangar 2 (i.e., 1970s), asbestos containing materials (ACMs), lead containing paint and polychlorinated biphenyls (PCBs) in fluorescent light ballasts may be present.*

Based on a review of the available information sources, the properties surrounding the Site have always been utilized for agricultural and residential purposes. Based on a review of the available information sources and on observations of current and historical surrounding properties (from publicly accessible locations), it is Amec Foster Wheeler's opinion that no significant environmental issues were identified concerning the Site's surrounding land use activities.

Based on the Phase I ESA completed by Amec Foster Wheeler, there is evidence of potential contamination associated with the Site. A Phase II ESA is recommended to address these potential concerns.

In addition, to address potential operational / management issues, Amec Foster Wheeler offers the following recommendation:

- *A Designated Substances Survey (DSS) is required if future repair, renovation or demolition activities are planned which could affect possible ACMs, LCPs and PCB containing fluorescent light ballasts. A DSS is required to fulfil the Owner's requirements under Section 30 of the Ontario Occupational Health and Safety Act, (the OHSA), Revised Statutes of Ontario 1990, (as amended). The building owner must provide the DSS report to all contractors working on the Property. Subsequently, all contractors must provide the DSS report to their subcontractors.*

1.2 Objective and Scope of Work

Amec Foster Wheeler's scope of work for the Phase II ESA included the drilling of seven boreholes (with associated soil sampling and analytical programs), installation of five ground water monitoring wells (with associated ground water sampling and analytical program) and collection of a surface soil sample, in an effort to determine Site characteristics and contaminants of potential concern (COPCs) including, metals, including hydrides, mercury, general inorganics (including electrical conductivity [EC], sodium adsorption ratio [SAR] and cyanide, free), fractionized petroleum hydrocarbons (PHCs) in the F1 to F4 ranges, volatile organic compounds (VOCs) or benzene, toluene, ethyl benzene and xylenes (collectively referred to as BTEX, a short list of VOC parameters typically associated with PHCs), polycyclic aromatic hydrocarbons (PAHs) and organochlorine pesticides (OCs). The surface sample, boreholes and monitoring wells were placed in exterior areas of the Site to address concerns identified in the Phase I ESA, as follows:

- BH/MW1 – in front (west) of old maintenance shop;
- BH/MW2 – behind the Air Cadets hangar, adjacent to a fuel oil aboveground storage tank (AST);
- BH/MW3 – in front (west) of current maintenance shop;
- BH/MW4 – adjacent to the Jet A fuel underground storage tanks (USTs);
- BH5 – adjacent to the east runway;
- BH/MW6 – on the abandoned (central) runway;
- BH7 – off the main (west) runway, in an area where a spill had previously occurred in October 2016; and
- SS101 – in the area of the former on-Site incinerator.

It is Amec Foster Wheeler's understanding that the Phase II ESA is not required for filing a Record of Site Condition (RSC) under Ontario Regulation 153/04 (*O. Reg. 153/04*, as amended). As such all work completed under this project was performed in general accordance with standard engineering practices and the following documents:

- Ministry of the Environment (MOE) document entitled "*Guide for Completing Phase Two Environmental Site Assessments under Ontario Regulation 153/04*" dated June 2011;

- Ministry of the Environment and Energy (MOEE) document entitled "*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario*", dated December 1996;

- MOE document entitled "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*" issued by the Laboratory Services Branch of the MOE and dated March 9, 2004, amended as of July 1, 2011 (Analytical Protocol); and

- All analytical results were compared to the appropriate standards identified in the Ministry of the Environment and Climate Change (MOECC) document entitled; *"Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act"* dated April 15, 2011 (MOECC SCS).

All work completed during the Phase II ESA was carried out in accordance with the Terms of Reference as provided in Amec Foster Wheeler's proposal dated August 4, 2017 and signed by the Client on August 14, 2017. It must be noted that the scope of work completed by Amec Foster Wheeler, as part of this assessment, may not be sufficient (in and of itself) to meet the reporting requirements for the submission of a RSC in accordance with *O. Reg. 153/04*, as amended. If a RSC is an intended product of work conducted at the Site, further consultation and/or work is required.

2.0 WORK PROGRAM AND METHODOLOGY

This section describes the methods used during this subsurface investigation work, including all drilling, and soil and ground water sampling activities. Laboratory quality assurance/quality control (QA/QC) procedures are also discussed.

Borehole drilling, soil sampling and ground water monitoring well installation activities were undertaken on September 11 and 12, 2017. Ground water monitoring well development and sampling activities were undertaken between September 19 and 21, 2017.

All borehole and monitoring well locations in the investigation area are illustrated on **Figure 2**. The borehole locations were selected to address areas of potential environmental concern identified during the Phase I ESA, as noted in Section 1.1.

The borehole drilling, monitoring well installation and soil and ground water sampling procedures used are detailed below.

2.1 Field Preparation

2.1.1 Subsurface Utility Locates

The locations of all buried and overhead services were obtained prior to the initiation of the subsurface investigation. Peninsula Video and Sound (PVS), located some of the public utilities on-Site (telephone, natural gas, hydro), as per their contract with Ontario-One-Call and the service providers. Niagara Locates Inc., a specialist private utility locating firm, was retained to undertake the private subsurface utility locates (for utilities not located by the above-referenced service providers).

2.2 Subsurface Investigations and Soil Sampling

2.2.1 Borehole Drilling and Soil Sampling

Under the supervision of Amec Foster Wheeler, a total of seven boreholes were drilled and five ground water monitoring wells were installed on September 11 and 12, 2017 by Direct Environmental Drilling (DED) of St. Thomas, Ontario (MOE License Number 7320). The boreholes were advanced to a maximum depth of between 3.0 and 6.7 metres below ground surface (mbgs) using a Geoprobe 7822 DT track mounted drill rig. Continuous samples were obtained in 1.5 m intervals throughout the borehole advancement. Soil cuttings generated during the investigation were minimal and left on-Site in a 208 Litre (L) steel drum. The locations of the boreholes and monitoring wells are shown on **Figure 2**. Details of the borehole drilling, as well as soil sampling, are provided in the borehole logs in **Appendix A**. All drilling activities were completed under the supervision of Amec Foster Wheeler field staff.

2.2.2 Surface Soil Sampling

On September 11, 2013, Amec Foster Wheeler collected one (1) grab (discrete) surface soil sample (SS101) from the topsoil located in the immediate vicinity of the former on-Site incinerator. The approximate sampling location is shown on **Figure 2**. The soil sample was placed in a labeled, laboratory-provided container, and was stored on ice in an insulated cooler for shipment to the laboratory.

2.2.3 Field Screening Measurements

All soil samples collected during drilling were screened in the field for gross evidence of negative environmental impact including staining and odours. Soil sample headspace screening was also performed to facilitate sample selections for laboratory analysis and to provide an assessment of the vertical contaminant distributions at each location. The duplicate soil sample fractions were screened for combustible organic vapour (COV) and total organic vapour (TOV) concentrations using the sample headspace method. COV and TOV concentrations were measured using an RKI EAGLE 2™ combustible vapour analyzer equipped with dual sensors and calibrated to known hexane and isobutylene standards and operated in methane elimination mode. The RKI EAGLE 2™ can detect 0-11,000 parts per million (ppm) and 0-100 % Lower Explosive Limit (LEL) with an accuracy of ±5% and the calibration standard is Hexane. The equipment is calibrated every day prior to the commencement of fieldwork.

The TOV/COV screening measures the cumulative organic/combustible vapour present within sample headspace. TOV/COV results are semi-quantitative at best and are generally only used for relative sample comparison purposes when selecting samples from individual boreholes for laboratory analysis.

The soil vapour concentrations are included in the borehole logs in **Appendix A**.

2.2.4 Sample Logging and Handling

The soil samples retrieved during the field investigations were examined, classified, and logged per soil type, moisture content, colour, consistency, and presence of visual and/or olfactory indicators of negative impact.

All soil samples were collected in accordance with strict environmental sampling protocols to minimize loss of volatile organics and to ensure reliable and representative results. All soil sampling equipment was thoroughly decontaminated between soil sample locations to prevent potential cross-contamination. Decontamination activities included:

- Physical removal of any adhered debris;
- Wash/scrub in “Alconox” soap solution;

- Distilled water rinse; and
- Methanol rinse/air drying.

Soil samples were split into duplicate fractions upon recovery. The primary sample fractions were placed into glass jars with Teflon-lined lids supplied by the laboratory with no preservative and samples that were potentially going to be submitted for analysis for PHC F1 and VOC/BTEX were sampled using dedicated laboratory prepared syringes into a 40 milliLitre (mL) vial preserved with methanol and delivered to the laboratory within 48 hours. All samples were subsequently stored in coolers on ice for future potential laboratory analysis. The duplicate sample fractions were placed in resealable plastic sample bags. Each sample was labeled using a unique identifier (borehole of origin and depth interval below grade). All samples were delivered to the laboratory under continuous Chain of Custody documentation.

All laboratory chemical analyses were conducted by Paracel Laboratories Limited (Paracel), an ISO 17025-accredited laboratory located in Ottawa, Ontario, except for OCs. The OC samples were subcontracted by Paracel to Testmark Laboratories Ltd., an ISO 17025-accredited laboratory located in Garson, Ontario.

The criteria for the selection of soil samples for laboratory analysis were based visual/olfactory observations and TOV/COV readings. The soil samples were submitted for pH determination, and analysis of metals including hydrides, mercury, general inorganics (EC, SAR and cyanide, free), PHCs, VOCs or BTEX, PAHs and OCs. The specific borehole/monitoring well locations and depth intervals of samples selected for analysis and the parameters they were submitted for are included in the Tables appendix at the end of this report.

2.3 Monitoring Well Installations

Overburden monitoring wells were installed at five locations, BH/MW1, BH/MW2, BH/MW3, BH/MW4 and BH/MW6 (**Figure 2**). These wells were installed to obtain hydrogeologic and ground water quality information from the hydrostratigraphic zone. These locations were selected for the monitoring wells as they represent the areas on the Site with the highest potential for ground water impact (refer to Section 1.2).

The monitoring wells were constructed using 51-millimetre (mm) diameter, schedule 40, flush-joint threaded PVC monitoring well supplies. The wells were completed with a 3.05 m length of #10 mill slotted intake screen. The top of the intake screen was then extended to the ground surface using solid riser pipe. A silica sand filter pack was placed between the intake screen and the wall of the borehole. The filter pack was extended approximately 0.3 m above the top of the well screen. A bentonite seal was placed above the sand pack to surface. The wells were completed with flush mount protective casings. Details of the monitoring well construction are included in the borehole logs in **Appendix A**.

2.3.1 Well Development, Ground Water Level Measurement, Purging and Sampling

The ground water monitoring wells installed at the Site during the investigation were instrumented with dedicated Waterra™ foot valve inertial pumps fitted with polyethylene tubing to facilitate well development. The newly installed wells were developed on September 19, 2017 by purging three well volumes using dedicated instrumentation (i.e., foot valve and tubing) or by purging dry two times. The monitoring wells were subsequently purged using low flow sampling techniques on September 21, 2017 until various parameters (including pH, conductivity and temperature) had reached stabilization criteria. During development and purging, an oil/water interface meter was used to measure potential accumulations of Light Non-Aqueous Phase Liquids (LNAPL) or Dense Non-Aqueous Phase Liquids (DNAPL), and ground water levels in the well.

Following monitoring and purging activities, Amec Foster Wheeler collected a ground water sample from each monitoring well into labelled, laboratory-provided containers using the low flow sampling system with dedicated instrumentation. The samples were stored in a cooler on ice after collection and during transportation to the laboratory where they were delivered under continuous Chain of Custody documentation. The sampling methodology including jar, bottle and preservative requirements followed the Analytical Protocol.

The representative ground water samples collected during the investigation was submitted for laboratory analysis of suspect COPCs including metals, EC, SAR, PHCs, VOCs or BTEX and OCs. All laboratory chemical analyses were conducted by Paracel.

3.0 RESULTS OF THE FIELD INVESTIGATION

3.1 Site Geology

The subsurface conditions encountered at the Site are described in the borehole logs provided in **Appendix A**.

In general, the surficial conditions encountered at the Site during the borehole drilling program consisted of surface structure (asphalt over granular fill at BH6, topsoil at BH/MW2 and BH/MW5, and sandy gravel fill at all other boreholes) extending to depths between 0.1 and 0.3 mbgs, overlying a layer of fill to a maximum of 1.7 mbgs. The fill layer generally consisted of silty clay / clayey silt fill, with traces of fine to medium gravel, organics and/or silty sand, and black, grey or light brown seams. Pieces of brick were also observed in the fill in BH/MW4.

The fill was found to overly a native brown silty clay / clayey silt with traces of silty sand, fine to medium gravel, and/or organics, and grey, red or light brown seams to the maximum drilled depth of 6.7 mbgs.

All boreholes were open and dry upon completion of the drilling program. The ground water levels measured in the five monitoring wells prior to development ranged from 1.5 to 5.4 mbgs and prior to sampling ranged from 3.9 to 5.8 mbgs.

3.2 Field Measurements

3.2.1 Staining and Odours

Visual and/or olfactory evidence of petroleum hydrocarbon or any other chemical-like impact was not observed during the drilling program except for some dark staining (no odour detected) in BH/MW3 (0.1-1.5 mbgs). The dark staining was inferred to be natural organics (confirmed by laboratory analysis, refer to Section 5.1).

3.2.2 COV and TOV Concentrations

COV concentration headspace measurements recorded in the soil samples collected from the boreholes ranged from non-detectable to 70 parts per million (ppm) in all samples except for BH/MW3-4 and BH/MW6-4 (190 ppm and 260 ppm, respectively). TOV concentration headspace measurements recorded in the soil samples collected from the boreholes ranged from non-detectable to 2 ppm. The COV and TOV concentrations headspace measurements are summarized in the borehole logs in **Appendix A**.

It is Amec Foster Wheeler's opinion that the results of the screening program suggest a low potential for the presence of significant combustible soil headspace vapour levels in the soil/fill samples collected from the boreholes, except for BH/MW3-4 and BH/MW6-4, which had a slightly higher potential for the presence of significant combustible soil headspace vapour. Laboratory analysis was performed to confirm and quantify these results.

3.2.3 LNAPL and DNAPL

During the development, purging and sampling of the monitoring wells, no LNAPL or DNAPL were observed.

4.0 REGULATORY FRAMEWORK

The SCS applicable to the Site have been evaluated based on the following rationale:

- The Site is occupied by an airport, which is classified as industrial use in accordance with *O. Reg. 153/04*;

- Grain size analyses was completed on a representative sample of the soils encountered on-Site (a composite of BH/MW1-3, BH/MW3-1, BH/MW3-2). The results of the grain size analyses indicated the sample is classified as medium and fine grained (i.e., contains 50% or more by mass of particles that are smaller than 75 µm (*O. Reg. 153/04, s.42 (2)*) with 97% passing the 75 µm sieve. As such, the Site has been classified as having medium and fine textured soils;

- No wells are present on the Site; however, the Site is in a rural area where water service is not available, and based on a search of the MOECC interactive well record mapping tool completed for the Phase I ESA, domestic wells are present at various properties within 250 m of the Site. As such, the SCS for use in a potable ground water condition are applicable to the Site;

- In accordance with *O. Reg. 153/04*, the Site includes land that is within 30 m of a "water body" (i.e., Welland River);

- Based on the boreholes drilled for the Phase II ESA, the depth to bedrock is greater than 2 m; and

- The Site was evaluated against the criteria for *Environmentally Sensitive Areas*, as defined by *O. Reg. 153/04* as amended:

    - Soil pH values were reported between 7.2 and 7.6 in the four soil/fill samples submitted from the borehole samples. The reported soil pH for all soil samples was within 5.0 to 9.0 units for surface soil (surface to 1.5 mbgs) and 5.0 to 11.0 units for subsurface soil (below 1.5 mbgs) (**Table 2**).

    - The Site, and lands within 30 m of the Site, were assessed for *Areas of Natural Significance*, as defined by *O. Reg. 153/04* as amended. The Site is classified as an Area of Natural Significance as:

        - Based on a review of the Niagara Region Core Natural Heritage Map, lands to the northeast, northwest and southwest of the Site are identified as Core Natural Areas (*Environmental Conservation Areas* and *Environmental Protection Areas.*

- Based on a review of the Town of Pelham Official Plan, Schedule B, the lands noted above are identified as Provincially Significant Wetlands (PSW), and lands to the northwest and east of the Site area classified as Deer Wintering Areas (Significant Wildlife Habitat). The woodlot northwest of the Site was labelled *"Welland Airport Woodlot"*, and the lands south of the Site were identified as E.C. Brown Conservation Area.

Based on the above site characteristics (specifically, the presence of an Area of Natural Significance within 30 m of the Site), the SCS currently applicable to the Site, if a RSC were to be filed for the Site, are the Table 1 Full Depth Background Site Condition Standards, residential/parkland/institutional/industrial/commercial/community property use and medium and fine textured soils (Table 1 SCS). However, it is noted that all borehole/monitoring well locations are located greater than 30 m from any Areas of Natural Significance and greater than 30 m from any water body and there is no intent to file a RSC for the Site. As such, as this Phase II ESA is being completed for due diligence purposes, the results have been compared to the Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition, industrial/commercial/community property use and medium and fine textured soils (Table 2 SCS). The results have also been compared to the Table 1 SCS for reference.

5.0 LABORATORY ANALYSES

5.1 Soil Sample Analyses

The results of the soil sample analyses, and their respective Tables 1 and 2 SCS, are summarized in **Tables 1 through 4**. The laboratory certificates of analysis are included in **Appendix B**.

The results of the analyses are summarized below:

- Seven samples from the borehole drilling program (BH/MW1-1c, B/H/MW2-1c, BH/MW2-4d, BH/MW4-1c and its field duplicate Dup B, BH5-1A and BH/MW6-1Bc) were submitted for pH determination. The pH ranged from 7.2 to 7.6 for surficial soils and was 7.6 for subsurface soils.

- Seven samples from the borehole drilling program (BH/MW1-1c, B/H/MW2-1c, BH/MW3-1c, BH/MW4-1c and its duplicate Dup B, BH5-1A, BH/MW6-1Bc) were submitted for EC and SAR analyses. EC and SAR were below the Table 2 SCS in all samples.

    - When compared to the Table 1 SCS, the following exceedance was identified:

        - EC in BH/MW6-1bc (943 microSiemens per centimetre [µS/cm]) versus the Table 1 SCS of 570 µS/cm.

- One sample from the borehole drilling program (BH/MW1-1c) was submitted for Cyanide, free analyses. Cyanide, free was not detected above the laboratory method detection limit (MDL) and was therefore below the Tables 1 and 2 SCS in this sample.

- Eight samples from the borehole drilling program (BH/MW1-1c, B/H/MW2-1c, BH/MW3-1c, BH/MW4-1c and its duplicate Dup B, BH5-1A, BH/MW6-1Bc, BH7-1bc) and one surface soil sample (SS101) were submitted for metals analyses. Concentrations of metals parameters were not detected above the laboratory MDLs and/or were below the Table 2 SCS in all samples with the following exceptions:

    - Lead in SS101 (257 micrograms per gram {µg/g}) versus the Table 2 SCS of 120 µg/g.

    - When compared to the Table 1 SCS, in addition to the lead noted above (Table 1 SCS for lead is also 120 µg/g), the following exceedances were identified:

        - Antimony in SS101 (5.2 µg/g versus the Table 1 SCS of 1.3 µg/g); and

        - Zinc in SS101 (327 µg/g versus the Table 1 SCS of 290 µg/g).

- Two samples from the borehole drilling program (BH/MW3-4d and BH/MW6-4d) were submitted for VOC analyses, five samples were submitted for PHC and BTEX analyses (BH/MW1-1d, BH/MW2-4d, BH/MW3-1d, BH/MW4-1d, BH7-1bd) and one sample (BH/MW4-2AD) was submitted for PHC analyses. Concentrations of PHC and VOC/BTEX parameters were not detected above the laboratory MDLs or were below the Table 2 SCS in all samples.
    - When compared to the Table 1 SCS, all submitted samples were below the Table 1 SCS for VOCs/BTEX, however, the following exceedances for PHCs were identified:
        - F3 and F4 range PHCs in BH/MW1-1d (307 µg/g and 149 µg/g respectively versus the Table 1 SCS of 240 µg/g and 120 µg/g, respectively); and
        - F4 range PHCs in BH/MW4-2AD (545 µg/g versus the Table 1 SCS of 120 µg/g).
- One surface sample (SS101) was submitted for PAH analyses. PAHs were not detected above the laboratory MDLs or were present at levels below the Tables 1 and 2 SCS.
- Three samples from the borehole drilling program (B/H/MW2-1d, BH/MW6-1A and BH7-1A) were submitted for OCs analyses. Concentrations of OCs parameters were not detected above the laboratory MDLs and were below the Tables 1 and 2 SCS in all samples.

5.2 Ground Water Sample Analyses

The results of the ground water sample analyses, and their respective Table 2 SCS, are summarized in **Tables 5 through 7**. The laboratory certificates of analysis are included in **Appendix B**.

The results of the analyses are summarized below:

- Five ground water samples (BH/MW1, BH/MW2, BH/MW3, BH/MW4 and BH/MW6) were submitted for metals analysis. Concentrations of metals parameters were not detected above the laboratory MDLs and/or were below the Table 2 SCS with the following exceptions:
    - Cobalt in BH/MW4 (6.2 micrograms per Litre [µg/L]) versus the Table 2 SCS of 3.8 µg/L;
    - Sodium in BH/MW6 (568,000 µg/L) versus the Table 2 SCS of 490,000 µg/L; and

- Uranium in BH/MW3, BH/MW4 and BH/MW6 (34.5, 35.4 and 36.6 µg/L respectively) versus the Table 2 SCS of 20 µg/L.

- When compared to the Table 1 SCS, in addition to the exceedances noted above (Table 1 SCS for cobalt and sodium are the same as Table 2 SCS; Table 1 SCS for uranium is 8.9 µg/L), the following exceedances were identified:

    - Uranium in BH/MW2 (19.5 µg/L) versus the Table 1 SCS of 8.9 µg/L.

- Four ground water samples (BH/MW2, BH/MW3, BH/MW4 and its field duplicate DUP A) were submitted for PHCs and VOCs analysis and an additional two ground water samples (BH/MW1 and BH/MW6) were submitted for PHC and BTEX analysis. Concentrations of PHC and VOC/BTEX parameters were not detected above the laboratory MDLs and were therefore below both the Tables 1 and 2 SCS in all samples.

- Five ground water samples (BH/MW1, BH/MW2, BH/MW3, BH/MW4 and BH/MW6) were submitted for OCs analysis. OCs were not detected above the laboratory MDL or were present at levels below both the Tables 1 and 2 SCS in all samples.

5.3 Quality Assurance Program

5.3.1 Accreditation

The analytical laboratory employed to perform the laboratory analyses (Paracel) is accredited by the Standards Council of Canada/Canadian Association for Laboratory Accreditation Standards in accordance with ISO/IEC 17025:2005 – *"General Requirements for the Competence of Testing and Calibration Laboratories"* for the tested parameters and has met the standards for proficiency testing developed by the Standards Council of Canada for parameters set out in the Soil, Ground Water and Sediment Standards.

5.3.2 Data Validation

Field QA/QC Program

The field QA/QC program consisted of analyzing one blind field duplicate soil sample for metals, pH, EC and SAR (Dup B, a field duplicate of BH/MW4-1c) and a blind field duplicate ground water sample for PHCs and VOCs (Dup A, a field duplicate of BH/MW4). The RPDs for the soil and ground water field duplicate samples were non-calculable or within acceptable limits except for EC in the BH/MW4-1c and Dup B (38% vs 10%). It is noted that the RPD values in the Analytical Protocol are for duplicate samples collected at the laboratory and are used for comparison to the RPDs calculated for field duplicates.

A field blank sample was submitted for analysis of VOCs. Field blanks are samples of laboratory provided reverse osmosis deionized (RODI) water, which is poured into a set of sample bottles at the same time and in the same general area as the samples are collected. The field blank is used to determine if there is presence of contamination because of field handling. The field blank was non-detectable for all parameters analyzed, indicating that the field activities did not bias the reported results.

A trip blank was submitted for analysis for VOCs. A trip blank is a sample of RODI water prepared and filled into the relevant sample bottles by the laboratory. The sample is sent with the bottle shipment, taken out to the field and then shipped back with the collected samples for analysis (not opened at any time by field staff). All parameters were found to be non-detectable in the trip blank.

A trip spike was submitted for analysis for VOCs. A trip spike is a sample of RODI water to which a known amount of analyte of interest and appropriate preservative has been added by the laboratory. This sample is also sent with the bottle shipment, taken out to the field and then shipped back with the collected samples for analysis (not opened at any time by field staff). The trip spike recoveries were considered within the acceptable ranges.

All fieldwork was conducted in accordance with the applicable sampling guidelines, which included dedicated sampling equipment, disposable gloves, and sample preservation, where required.

Laboratory QA/QC Program

All sample analyses were performed within the required sample/extract hold times.

The analytical results reported for all laboratory duplicate, blank and spike samples were acceptable except as specified on the laboratory certificates of analyses (**Appendix B**).

In general, no information provided in the QA/QC results for soil and ground water samples would impact the findings of the Phase II ESA.

6.0 CONCLUSIONS

The Phase II ESA included the drilling of seven boreholes, installation of five ground water monitoring wells (with associated sampling and analytical programs) and collection of one surface sample to determine Site characteristics and COPCs including, metals, general inorganics, PHCs, VOC/BTEX, PAHs and OCs. The surface sample, boreholes and monitoring wells were placed in exterior areas of the Site to address concerns identified in the Phase I ESA, as follows:

- BH/MW1 – in front (west) of old maintenance shop;
- BH/MW2 – behind the Air Cadets hangar, adjacent to a fuel oil AST;
- BH/MW3 – in front (west) of current maintenance shop;
- BH/MW4 – adjacent to the Jet A fuel USTs;
- BH5 – adjacent to the east runway;
- BH/MW6 – on the abandoned (central) runway;
- BH7 – off the main (west) runway, in an area where a spill had previously occurred; and
- SS101 – in the area of the former on-Site incinerator.

In general, the surficial conditions encountered at the Site during the borehole drilling program consisted of surface structure (asphalt over granular fill at BH6, topsoil at BH/MW2 and BH/MW5, and sandy gravel fill at all other boreholes) extending to depths between 0.1 and 0.3 mbgs, overlying a layer of fill to a maximum of 1.7 mbgs. The fill layer generally consisted of silty clay / clayey silt fill, with traces of fine to medium gravel, organics and/or silty sand, and black, grey or light brown seams. Pieces of brick were also observed in the fill in BH/MW4.

The fill was found to overly a native brown silty clay / clayey silt with traces of silty sand, fine to medium gravel, and/or organics, and grey, red or light brown seams to the maximum drilled depth of 6.7 mbgs. All boreholes were open and dry upon completion of the drilling program. The ground water levels measured in the five monitoring wells prior to development ranged from 1.5 to 5.4 mbgs and prior to sampling ranged from 3.9 to 5.8 mbgs.

Visual and/or olfactory evidence of petroleum hydrocarbon or any other chemical-like impact was not observed during the drilling program except for some dark staining (no odour detected) in BH/MW3 (0.1-1.5 mbgs). The dark staining was inferred to be natural organics (confirmed by laboratory analysis, refer to Section 5.1).

During the development, purging and sampling of the monitoring wells, no LNAPL or DNAPL were observed.

Based on the presence of an Area of Natural Significance within 30 m of the Site, the SCS currently applicable to the Site, if a RSC were to be filed for the Site, are the Table 1 Full Depth Background Site Condition Standards, residential/parkland/institutional/industrial/commercial/community property use and medium and fine textured soils (Table 1 SCS). However, it is noted that all borehole/monitoring well locations are located greater than 30 m from any Areas of Natural Significance and greater than 30 m from any water body and there is no intent to file an RSC for the Site. As such, as this Phase II ESA is being completed for due diligence purposes, the results have been compared to the Table 2 Full Depth Generic Site Condition Standards in a Potable Ground Water Condition, industrial/commercial/community property use and medium and fine textured soils (Table 2 SCS). The results have also been compared to the Table 1 SCS for reference.

The results of the soil and ground water chemical analyses indicated that the concentrations of all general inorganics, metals, PHC, VOC/BTEX, PAH and OC parameters in all samples were below the Table 2 SCS with the following exceptions:

- Lead in soil in surface samples SS101 (257 µg/g versus the Table 2 SCS of 120 µg/g). SS101 was a grab sample of topsoil collected near the on-Site incinerator representing a depth of 0 to 0.2 mbgs.
- Cobalt in ground water sample BH/MW4 (6.2 µg/L versus that Table 2 SCS of 3.8 µg/L);
- Sodium in ground water sample BH/MW6 (568,000 µg/L versus the Table 2 SCS of 490,000 µg/L); and
- Uranium in ground water samples BH/MW3, BH/MW4 and BH/MW6 (34.5, 35.4 and 36.6 µg/L respectively) versus the Table 2 SCS of 20 µg/L.

In addition to the above, the following additional exceedances were noted when the results were compared to the more stringent Table 1 SCS:

- EC in soil sample BH/MW6-1bc (943 µS/cm) versus the Table 1 SCS of 570 µS/cm;
- Antimony and zinc in surface soil sample SS101 (5.2 µg/g and 327 µg/g respectively, versus the Table 1 SCS of 1.3 µg/g and 290 µg/g, respectively);
- F3 and F4 range PHCs in soil sample BH/MW1-1d (307 µg/g and 149 µg/g respectively versus the Table 1 SCS of 240 µg/g and 120 µg/g, respectively);

- F4 range PHCs in soil sample BH/MW4-2AD (545 µg/g versus the Table 1 SCS of 120 µg/g); and

- Uranium in BH/MW2 (19.5 µg/L) versus the Table 1 SCS of 8.9 µg/L.

To determine the area of concern for elevated metals near the on-Site incinerator, Amec Foster Wheeler recommends the collection and submission of additional surface samples (both at surface and at depth for vertical delineation) for metals analyses. This would allow us to estimate a remediation area, if the Client elects to complete a remediation of the metal-impacted soils.

In addition, Amec Foster Wheeler recommends that additional intrusive investigations be completed in order to adequately address all of the potential environmental issues identified in the Phase I ESA. Additional boreholes with associated soil sampling and laboratory analysis are recommended in the following areas: in the vicinity of the existing USTs, in the general location of former ASTs or USTs (if these can be identified), within the footprint of the former maintenance shop (specifically in pits, previous oil or chemical storage locations and for general coverage), in the location of the former barracks, additional coverage in the area of the 2016 fuel spill, and for general coverage in the developed portions of the Site.

It has been Amec Foster Wheeler's experience on other properties near the Site that cobalt, sodium and uranium can be naturally elevated above the Tables 1 or 2 SCS in wells installed in native silty clay. As this is also the case at this Site, it is inferred that these metals in ground water are more likely naturally occurring rather than elevated because of on-Site activities.

It is our understanding that the CLIENT will review the findings of this Phase II ESA and determine the future course of action.

Should the ground water monitoring wells no longer be required, they must be maintained or abandoned in accordance with the requirements of Section 21(3) of Ontario Regulation 903 – Wells which states *"the well owner shall immediately abandon the well if it is not being used or maintained for future use as a well"*.

7.0 LIMITATIONS

This report was prepared for the exclusive use of Niagara Central Dorothy Rungeling Airport and is intended to provide a Phase II ESA of the property at 435 River Road, in Pelham, Ontario at the time of the Site visit. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from Amec Foster Wheeler will be required. With respect to third parties, Amec Foster Wheeler has no liability or responsibility for losses of any kind whatsoever, including direct or consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The investigation undertaken by Amec Foster Wheeler with respect to this report and any conclusions or recommendations made in this report reflect Amec Foster Wheeler's judgment based on the Site conditions observed at the time of the Site inspections set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this Site and it is based, in part, upon visual observation of the Site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future Site conditions, portions of the Site, which were unavailable for direct investigation, subsurface locations, which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Amec Foster Wheeler has used its professional judgment in analysing this information and formulating these conclusions.

Amec Foster Wheeler makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

This Report is also subject to the further Standard Limitations contained in **Appendix C**.

8.0 CLOSURE

We trust that the information presented in this report meets your current requirements. Should you have any questions, or concerns, please do not hesitate to contact the undersigned.

Yours truly,

Amec Foster Wheeler Environment & Infrastructure,
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