June 4, 2026

Directorate of Contaminated Sites (Ontario)
Department of National Defence
22 Wing North Bay
Hornell Heights, ON, Canada, POH 1PO
E-mail: NorthBayPFAS-NorthBayPFAS@forces.gc.ca

Re: Response to Department of National Defence's Intent to Make a Determination Installation of a Permeable Adsorptive Barrier (PAB) at 22 Wing North Bay published April 28, 2026

For your consideration, the Trout Lake Conservation Association, Nipissing Environmental Watch (NEW), Northwatch and the Canadian Environmental Law Association submit the following commentary and recommendations in response to Department of National Defence's (DND) notice of Intent to Make a Determination Installation of a Permeable Adsorptive Barrier (PAB) at 22 Wing North Bay as posted on April 28, 2026 on the Impact Assessment Agency public registry as Reference # 90412.[1] No additional public notice was provided locally, and local stakeholders were not informed of the comment period. We appreciate DND having provided us with a summary and two related reports upon our request, but are of the view that these documents should have also been available through the registry and so available to other interested parties.

General Comments:

Remedial action on the extensive contamination emanating from DND properties at CFB North Bay is a matter of urgent public interest. We welcome the subject proposal as an

[1] As seen at https://iaac-aeic.gc.ca/050/evaluations/proj/90412?culture=en-CA on 29 April 2026

indication of DND's commitment to take action towards remediation of poly- and per fluoroalkyl substances (PFAS).

The recent proposal by DND to Make a Determination Installation of a Permeable Adsorptive Barrier (PAB) at 22 Wing merits consideration. While it is important to explore all options to find technology and approaches that will eliminate the PFAS released to the environment from DND properties, the information accessible in the posting on the Impact Assessment Registry is too limited to support the public in providing comments and recommendations on the proposal. No background materials and technical documents to support and rationalize the proposal were posted to the registry, as noted above.

In order to understand and provide substantial comments on this proposed approach, particularly to initiate a pilot test to install PAB and consider full scale implementation of the use of PABs to remediate PFAS contamination, the full strategy on PFAS remediation at Wing 22 and impacted communities and areas should be shared for consideration. The proposal for the installation of the PAB is one option under consideration. To develop the most informed responses to the PFAS problem, it is important to identify all measures under consideration by DND with other federal departments, provincial departments and municipal offices (including public health units) with respect to PFAS remediation. Such a strategy on PFAS remediation should include the following components and be subject to full disclosure and public input:

- Share details of all approaches and technologies to be deployed to address PFAS contamination in North Bay
- Identify the scope of PFAS substances that will be addressed in the proposed remediation approaches
- Evaluate levels of remediation or reduction of PFAS (including all PFAS substances) to be targeted for each approach or technology
- Outline timelines for evaluation, monitoring and reporting and engaging with the community on the results from monitoring for those technologies deployed; reporting and community dialogue should take place – at minimum - on an annual basis
- Identify responsibilities of each department or government agency in the strategy, and
- Outline community engagement and input in the development and revisions of the strategy.

The broader Strategy on PFAS Remediation is not fully available to North Bay residents at this point with the exception of information provided to participants attending the November 2025 public information session, where it was disclosed that Soil Remediation

(already underway) and Ground water remediation would be explored, along with future water treatment options to be employed by the City of North Bay.[2]

The community engagement in this process should be further expanded as North Bay residents are directly impacted by the decisions by the departments. The current approach of posting select and individual proposals for PFAS remediation to the Impact Assessment Registry on individual proposals of PFAS remediation is highly inadequate as a mechanism to engage the public effectively. Further work is needed by DND and other agencies to further develop the PFAS remediation strategy at 22 Wing and present and seek input from community members in a transparent and open manner. This level of transparency is necessary to better understand the challenges and impacts on community members and incorporate public input to improve decision making and remediation outcomes.

RECOMMENDATION: DND with other federal, provincial and municipal agencies should develop and release a full Strategy on PFAS remediation at 22 Wing and seek full community engagement and input.

Goal of PFAS remediation is underwhelming

Consistent messaging by DND officials on PFAS remediation is underwhelming and concerning. For example, it has been emphasized that 100% PFAS remediation is not achievable. Subsequently, the public has continued concerns about impacts to health, environment and their homes as a result of continued exposure to PFAS from the contamination from 22 Wing. Impacts of PFAS exposure is associated with a range of adverse impacts to health including:

> *"kidney and liver impairment, thyroid disorders, immunotoxicity, cardiotoxicity, neurological effects, reproductive toxicity, and carcinogenicity. The potential risks posed to human health by PFASs are not to be underestimated," stated by Zang et. al.*[3]

When considering approaches to PFAS remediation these adverse impacts should be further considered and remain top of mind in selecting the most stringent approach for the protection of the health of the community.

---

[2] See the City of North Bay's information page at https://northbay.ca/our-community/environment-sustainability/pfas-information/ and a recording of presentations at the November 2025 information session at https://www.youtube.com/watch?v=lOwetBNcQkA

[3] Hao Zang, Yingming Feng, Shengyuan Gao, Mangmang Su, Qiyan Feng and Xiangfeng Chen. A review on technologies for the removal of perand polyfluoroalkyl substances (PFASs) in aquatic environments Environ. Sci.: Adv.,2025,4, 1712)

DND proposes to make a determination to install Permeable Adsorption Barriers to adsorb PFAS in groundwater impacted by the PFAS released from the 22 Wing using colloidal activated carbon. The proposal will aim to conduct a pilot test of the PAB requiring a 70 m barrier to determine the effectiveness of PFAS absorption for one year. Testing of PFAS levels will be conducted on a quarterly basis. Based on the results of the pilot tests, the proposal will extend the PAB to 250 metre in length. While this proposed approach may result in the reduction of PFAS levels (as adsorbed by the CACs) in the groundwater, its contribution to the full impact of PFAS contamination in North Bay is not fully estimated. This analysis will be crucial to understanding how PFAS contamination in North Bay is fully addressed.

In the following sections of this submission, we provide comments specific to the proposed PAB project.

Developing Criteria to Measure Effectiveness of PAB approach

Absent is a set of critical criteria elements that will be used to determine the effectiveness of the PAB approach. The current posting on the Impact Assessment Registry gives no details on what the criteria and factors that will be used to measure the effectiveness of the pilot tests and decision to deploy a full-scale approach to PFAS remediation using PAB.

Some critical elements that should be considered in a set of criteria include:

1) Targeting PFAS levels changes reductions – what is the percentage change - with PAB deployed - that would show effectiveness of the PAB? Is it 95%, 80% or 60%? What is the required or anticipated level of effectiveness and what is the basis for that level or anticipated effectiveness? And is that level of effectiveness the level that is anticipated or the level that is required?
2) Demonstrating and comparing the PFAS resulting (reduced) concentration per PFAS substance against federal drinking water screening values, environmental guidelines, etc.
3) Providing analysis showing that that the proposed length of the proposed barrier (i.e. the full project, not the pilot project) at 250-meter range for PAB is sufficient (demonstrating the geology of the groundwater flow and plume are fully captured) and will result in 100% adsorption of PFAS for the improved protection of community health and environment
4) Contribution to the improvement to the environment – groundwater and receiving environment (soil and water quality of Trout Lake, Lees Creek) testing of PFAS in drinking water sources for surrounding community residents.

Creating transparency and engaging the community throughout the deployment of the technology and seeking feedback on the testing, monitoring results and analyzing the level of PFAS adsorption achieved.

Specific comments on the PAB technology

The DND proposal to install PAB for pilot testing and possibly full scale at 22 Wing should provide the following information prior to a final determination.

1) Activated Carbon effectiveness on all PFAS substances are uncertain

Several studies by Zang et. al (2025), Meservey et. al (2026), and Lundell (2025) have shown that activated carbon is an effective and low-cost method to adsorb PFAS in ground water.[4,5,6] The level of effectiveness for absorbing PFAS is determined by the type of activated carbon used: powered activated (PAC), granular activated carbon (GAC) and colloidal activated carbon (CAC). All studies found that activated carbon are effective in addressing long chain PFAS particularly PFOS and PFOA while noting that activated carbon is less effective to adsorb short chain PFAS substances. [7, 8] As CAC are proposed for the PFAS remediation project for 22 Wing for in situ remediation of ground water, it is important to better understand the PFAS substances intended to be captured by the PAB. DND personnel indicated a range of PFAS will be targeted with PFOS being emphasized as the main concern of DND. Full disclosure of the presence of all PFAS substances from 22 Wing should be made and substantial analysis on how the CAC approach will aim to address the full scope of PFAS substances (particularly short chain PFAS) beyond PFOs.

RECOMMENDATION: Full disclosure on all PFAS relevant for the proposed PAB is required and DND should provide an analysis on how CACs will absorb PFAS substances including long chain PFAS (e.g. PFOS, PFOA) and specific short chain PFAS (4 carbon chain).

---

[4] Hao Zang, Yingming Feng, Shengyuan Gao, Mangmang Su, Qiyan Feng and Xiangfeng Chen. A review on technologies for the removal of perand polyfluoroalkyl substances (PFASs) in aquatic environments Environ. Sci.: Adv.,2025,4, 1712)

[5] Alexis Meservey, Micala Mitchek, Joe Wong and Kurt D. Pennell. Competitive adsorption of per- and polyfluoroalkyl substances (PFAS) on activated carbon.XXX

[6] Frida Lundell. 2025. Retention of per- and polyfluoroalkyl substances (PFAS) in natural groundwater by soil material from a permeable reactive barrier with Colloidal Activated Carbon. https://stud.epsilon.slu.se/21662/1/Lundell-F-250905.pdf

[7] Frida Lundell. 2025. Retention of per- and polyfluoroalkyl substances (PFAS) in natural groundwater by soil material from a permeable reactive barrier with Colloidal Activated Carbon. https://stud.epsilon.slu.se/21662/1/Lundell-F-250905.pdf

[8] Regenesis. 2024. Understanding PFAS Remediation Using Colloidal Activated Carbon. https://regenesis.com/wp-content/uploads/2025/08/REG-161-EBK-Sorption_12.pdf

2) Factors affecting adsorption capacity for PFAS should be disclosed

The ability of the PAB to adsorb PFAS substances depends on the type of material injected in the subsurface for the purpose of binding PFAS. The proposed installation of PAB at 22 Wing indicates the use of CACs. No additional details have been provided on the materials effectiveness to adsorb PFAS substances or other co-contaminants that may be present in the groundwater. Some materials may be more effective in adsorbing PFAS substances with longer chain PFAS substances such as PFOS and PFOA being the most dominant to be adsorbed and shorter chain PFAS having the ability to pass the initial adsorption materials. The CAC may also adsorp co-contaminants (e.g. benzene) that could have been released from the fire fighting training conducted at the base. The study by Hakimabadi et. al (2023) noted the following factors: "retention and breakthrough of PFAS in a barrier will be dependent upon several factors, including the mass flux of PFAS entering the barrier, the mass of adsorbent injected and its distribution in the barrier, the competition for adsorptive sites among PFAS as well as between PFAS and co-contaminants, and the groundwater water chemistry," [9] impacting the effectiveness of CACs used to capture PFAS. To fully elucidate the impacts of the application of CACs as the preferred material in the PAB, detailed information on these factors should be disclosed to understand how effective the proposed installation will be to address a range of PFAS substances released from 22 Wing base.

RECOMMENDATION: Require full disclosure of the composition of the Colloidal Activated Carbon to be deployed in the PAB and include the level of effectiveness in adsorbing PFAS substances by these materials.

RECOMMENDATION: Provide details on the factors (mass flux of PFAS from the 22 Wing base, mass of the adsorbent used and its distribution in the barrier, competition for adsorptive sites among PFAS and other co-contaminants, and groundwater chemistry) that will determine the effectiveness of PFAS adsorption for the CAC to injected in the PAB.

3) Testing Protocol for all PFAS substances in Proposed Project is needed

The proposed pilot testing for PAB for quarterly PFAS testing has been noted and will be a significant factor for determining full scale deployment for PAB for 22 Wing. Further details on what testing methods will be deployed and for what PFAS have not been provided. It

[9] Seyfollah Gilak Hakimabadi, Alannah Taylor, Anh Le-Tuan Pham. Factors Affecting the Adsorption of Per- and Polyfluoroalkyl Substances (PFAS) by Colloidal Activated Carbon. Water Research, Volume 242,2023, 120212. ISSN 0043-1354.
https://www.sciencedirect.com/science/article/pii/S0043135423006486)https://www.sciencedirect.com/science/article/abs/pii/S0043135423006486

would be insufficient to focus only on one or two PFAS when there may be more substances from the PFAS contamination warranting attention. Given that there are limited PFAS testing methods available, it is critical to fully disclose the methods used and the levels of detection for each testing methods.

Furthermore, all testing results should be fully disclosed, publicly released and accessible.

RECOMMENDATION: Disclose the intended testing methods and their non-detect levels that will be used for <u>all</u> PFAS substances to be tracked in the upgradient and downgradient to the PAB. Also disclose which PFAS substances (particularly short chain PFAS substances) are present.

4) PFAS levels should be collected - Testing sites, Timing and Sample size

It is necessary to outline a substantial testing regime for PFAS levels upgradient and down gradient to the PAB. However, it is equally important to include testing and monitoring of PFAS to receiving waters connected to the groundwater sources that should include wells and drinking water taps and receiving surface water, particularly Trout Lake. The number of testing/monitoring sites upgradient and down gradient of the PAB should be disclosed and results shared to show how effective the adsorption capacity of the barrier materials is. Frequent sampling of the PFAS levels should be undertaken and reported. Expand the monitoring regime from quarterly to monthly to demonstrate the effectiveness of the adsorption material on a month-to-month basis.

In addition, it is unclear and uncertain whether further injection of adsorption material will be required with the PAB technology. Some studies demonstrate effective adsorption of PFAS for several years while other studies reveal that further injection of adsorption material may not be necessary for decades. This level of uncertainly should be better addressed as there are many factors that can impact how effective adsorption materials are for PFAS substances. This includes flux rate (as noted above) of the ground water, amount and types of PFAS being released with other contamination, width of the barrier to contain the adsorption materials, and the hydrology and groundwater chemistry.

5) Waste and final treatment of PAB and injection materials

While DND staff indicated that they do not expect to have any waste issues to address regarding the PAB, it is unclear what occurs to the PAB structure and materials at the end of its life cycle. Based on ongoing monitoring of existing use of CACs in PABs, the lifespan of the installation is expected to last may years and even decades. However, it is unclear how DND will manage the PAB installation and the injected CACs if/when the structure breaks down or it reaches the end of life/effectiveness. The injected materials would contain PFAS substances as well as co-contaminants that need to be managed. There will also be situations where the CACs reach its capacity for adsorption (with no changes to PFAS levels down gradient) that may require refilling the CAC. It is important to explain why

refilling rather than removal and replacement of CACs would be the preferred option, as has been indicated by DND consultants[10]. The substrate would continue to hold PFAS substances at adsorption sites if not removed.

Any materials removed from the installation site may contain PFAS materials (particularly in the activated carbon that would require special handling as hazardous materials).

RECOMMENDATION: Require additional information outlining what type of waste will be generated from the installation and throughout the lifespan of the PAB. In addition, provide an explanation why PFAS contained in adsorpton sites of the CAC would not be extracted and managed as hazardous materials from time to time during and at the end of the life span of the PAB.

6) Impact of PAB to drinking water sources for communities

The DND will be making substantial investments in PFAS remediation. The focus of this investment is presumably to ensure protection of health of the community and their drinking water sources. There is no information made available as to how community health will be monitored or tested as it relates to the proposed project for PAB.

RECOMMENDATION: The proposal should consider assessing the health of the community and environment as part of the larger set of remediation efforts but including this proposed project. This approach could include testing drinking water sources, monitoring PFAs levels in residences as well as monitoring for chronic illnesses associated with PFAS exposure.

Organizations descriptions

The Trout Lake Conservation Association advocates on behalf of Trout Lake to various levels of government, expresses opinions on local initiatives affecting this beautiful local asset, regularly communicates important information concerning the health of the lake to our membership and the public and helps to promote Watershed stewardship.

Northwatch is a regional environmental non-governmental organization with membership and member groups across northeastern Ontario, including in the Trout Lake watershed in the district of Nipissing. Northwatch has a dual mandate of advocating for environmental protection and supporting public participation in environmental and social decision-making processes.

[10] Online meeting of signatory groups with DND and WSP, 21 May 2026

Nipissing Environmental Watch (NEW) is primarily involved in speaking up for the local environment. As residents of a small city, we focus on North Bay's potential to help curtail the climate crisis and build climate resiliency.

Canadian Environmental Law Association (CELA), established in 1970, is a not for profit legal aid clinic specializing in environmental law. CELA provides legal assistance to low-income and disadvantaged individuals and groups experiencing environmental problems, who are otherwise unable to afford legal representation. Potential clients come to CELA seeking legal assistance with respect to problems caused by the creation, use, or release of toxic substances in their communities. Our assistance to them may come in the form of summary advice, legal representation, law reform advocacy, or community outreach.

Contact information

Trout Lake Conservation Association
Contact: Carol Hansman (email: dc.hansman@sympatico.ca)

Northwatch
Contact: Brennain Lloyd (email: brennain@northwatch.org)

Nipissing Environmental Watch
Contacts: John Patterson (email: johnpattersonincorbeil@gmail.com); Peggy Walsh Craig (email: peggywalsh9@outlook.com); Kelly Anne Smith (email: waterwatchr@gmail.com); Cindy Lalande (email: crlande827@gmail.com)

Canadian Environmental Law Association
Contact: Fe de Leon (email: deleonf@cela.ca)