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15 April 2015

Mr. Jeremy DeVries
7815 Wellington Rd. 36
Puslinch, Ontario

By E-mail

Jeremy,

Re: Environmental Implications of Proposed Fill Project

This technical review is submitted in response to your request, in regard to the proposed fill project at the property at 7827 Wellington Rd. 36. This submission is based on the information that has been made available through the public process to date. That information has been assessed and interpreted in context of the understanding and expectations I have as a highly qualified and experienced environmental scientist.

My main conclusions at this time are as follows:

- The fill project poses a series of identifiable risks to the environment and human health
- The risks relate to:
  - impairment of water resources, both as affecting significant natural features and potable water supplies,
  - harm to species at risk (SAR) and/or the habitat of SAR
  - impairment of air quality through emission and dispersion of atmospheric contaminants, including suspended particulates
  - impairment of quality of life and health as a result of excessive noise, impaired air quality, and impaired water quality
- The information that has been put forward to date through the public process, regardless of how it may be deemed to satisfy specific requirements, is inadequate to reliably assess these risks, or subsequently to allow development of effective mitigation plans.

My recommendations are to submit the technical review to the parties of authority in the approval process, so that they can give it full and fair consideration in whatever decisions they might make. At a minimum, I would expect a robust response on all of the issues raised, and a justification of how they have been reconciled in the process.

Reference: Environmental Implications of Proposed Fill Project

If you have any questions or concerns regarding this report, please do no hesitate to contact me at your convenience.

Sincerely,

Neil Morris, Consulting Ecologist
2480 Olde Baseline Rd.
Caledon, Ontario
L7C 0J3

Environmental Review - Proposed Fill Project

Report prepared for:
Mr. Jeremy Devries

Report prepared by:
Neil Morris, Consulting Ecologist
Report Reference # 15-02.1

15 April 2015

Purpose

This submission has been prepared at the request of Mr. Jeremy Devries of 7815 Wellington Road 36, Township of Puslinch. The matter addressed herein is the proposed dumping of fill on the property, adjacent to the residence of Mr. Devries, at 7827 Wellington Road 36, Township of Puslinch. Specifically, there is an application before council for the placement of ~69,000 m^3 of clean fill over an area of approximately 4 acres on the western portion of the noted property. The project described in the application is hereafter referred to simply as the *fill project.*

Approach

Presented herein is an independent, qualified, *a priori* review of potential adverse effects of the fill project. For the record, I am a qualified consulting environmental scientist with 25 years of experience assessing the potential adverse effects of human activity on the environment and human health. My experience includes numerous assessments of the impacts of development on sensitive natural features (e.g. wetlands), and also assessments of the effects of environmental stressors on environmental media (air, water, soil), ecological receptors, and human health. This body of experience includes a variety of projects addressing the environmental implications of agricultural practices. I also have considerable experience in the development and implementation of environmental policies, regulations and practices for both government (Federal, Provincial and Municipal) and industry. Additionally, my conclusions regarding this fill project are partly informed by my experience in the production of hay for equines on non-prime agricultural land.

This review considers written material made available to me that is of direct relevance to the potential impacts of the project. My understanding is that the in formation in hand is the sum of information made available through the public process to date. Time has not permitted any dialogue with parties that may have additional knowledge of relevant issues (e.g. Conservation Halton in regard to wetland protection). Time restrictions have also not allowed for any detailed independent technical studies of any of the issues of concern.

It is recognized that there are a set of prescribed issues that compel the proponent to submit information to the satisfaction of approval and/or regulatory authorities. It is also acknowledged that there is always room for interpretation as to when and where given policies or regulations might be deemed relevant, or how they might be implemented. This review is not constrained by explicit policy or regulatory relevance. Rather, the review provides an objective scientific analysis of all environmental risks posed by the fill project, as could be reasonably anticipated by a qualified person, regardless of any judgment on procedural relevance.

The review also adopts a perspective consistent with the emerging regional consensus regarding fill application procedures. Conservation authorities in proximity to the GTA

(CVC, CLOCA, GRCA) and other nearby municipalities (e.g. Halton Region) have all implemented or considered procedures to ensure that applications for fill within their respective jurisdictions overcome acknowledged gaps in the existing regulatory framework. The general intent is to ensure that various potential environmental impacts are not ignored in the process. This report seeks to identify and assess the full range of potential impacts.

Scope of Concerns

The environmental risks addressed in this review basically reflect the established list of "adverse effects", as defined in the *Environmental Protection Act*, and include:

- impairment of the quality of the natural environment for any use that can be made of it;
- injury or damage to property or plant or animal life;
- harm or material discomfort to any person;
- an adverse effect on the health of any person; and
- loss of enjoyment of normal use of property.

Specifically, the issues of concern that are addressed herein are as follows:

- Impacts on nearby sensitive natural features (the PSW, Mountsberg Creek)
- Impacts on species at risk, both aquatic and terrestrial
- Impacts on air quality, and associated impacts on environmental and human health
- Impacts of noise disturbance on wildlife and human health

To the extent possible at this time, each issue is analyzed below, followed by conclusions and recommendations that reflect the findings of the analyses.

Analysis:

<u>Species at Risk</u>

The Ontario *Species at Risk Act* compels proponents and approval authorities to address the potential of development projects on those species of wildlife that have been assessed and designated as Species at Risk (SAR).

To date, there appears to have been no assessment at all of the possible presence of SAR at or near the project site, or any effort to examine the potential for adverse effects or to develop measures to mitigate those effects.

Based on the current list of SAR in Ontario, records of SAR presence in the general area of interest (NHIC data for Halton Region), and a general understanding of habitat present at or near the project site, there are a number of SAR that could be present. There are 32

Provincial SAR documented for Halton Region, and the general habitat needs of about half of these are met on or near the site of the fill project. This includes several species of grassland bird (e.g. Bobolink, Eastern Meadowlark) that have a high likelihood of occurrence in pasture areas, and several species of plant, amphibian and fish that may be associated with the wetland or Mountsberg Creek.

The fill project could have adverse effects on SAR through the following mechanisms:

- Direct harm to individuals present in the fill area during fill placement
- Disturbance of SAR in the area due to high levels of activity and noise
- Impairment of plant SAR through dust deposition
- Impairment of habitat of aquatic SAR through alteration of water quality (temperature, pH, general chemistry) or quantity

In current absence of appropriate surveillance data, the SAR implications of the project can only be the subject of speculation. For the time being, there is an uncertain level of risk to consider. To make an informed decision with respect to SAR, as a component of a comprehensive risk-benefit analysis, an adequate study needs to be completed.

<u>Water-related Impacts</u>

A primary focus at this time is a report that was prepared in November 2013. It is not clear if this report was submitted to meet the requirement of Conservation Halton for the issuance of a permit in accordance with Regulation 162/06. No other report that might serve that purpose has been disclosed.

A primary focus of a report for this purpose should be the characterization of the relationship between the subject property and the nearby Provincially Significant Wetland (PSW), mainly in terms of surface water and groundwater exchanges between the property and the PSW.

To be adequate and effective for this purpose, the report should encompass the following:

- reliable characterization of the overall hydrodynamics of the PSW itself,
- reliable characterization of the all aspects of the subject property that would affect the quantity and quality of surface or groundwater inputs to the PSW,
- reliable determination of the relative importance of those inputs to the function of the wetland, and
- based on the above, an informed assessment of the potential for changes in the hydrological inputs from the property to the wetland, and subsequent adverse affects on this significant natural feature and its function.

The report in question provides a limited characterization of site hydrology and hydrogeology that is based on the following:

- statements of the proponent.
- a single site visit on 21 Nov. 2013
- reference to a quaternary geology report

There has been no direct testing of soil profiles, infiltration rates, bedrock integrity, movement of surface water or groundwater, or any other aspect of relevance. The main conclusions of the report are based on anecdote and inference. While there is no site-specific information on hand to counter any of the assumptions or inferences, there has certainly not been sufficient information presented to warrant their acceptance.

At a minimum, there are assumptions and conclusions of the report that do appear counterintuitive or questionable, even in absence of the data necessary to validate or refute them. For one, the report's assertions regarding the saturation status of the area of fill placement is questionable. The report's contention is that the area is wet year round, but also has no connection to groundwater. The report only mentions precipitation as a hydrological input, and ignores any other possible sources of water moving through the fill area towards the wetland and creek. Arguably, the area would have a high probability of drying out during periods of low precipitation and high evapotranspiration (i.e., summer months) unless there were upgradient inputs of surface water or shallow groundwater. There is no mention in the report of movement of such water into or through the property. This would need to be considered in a thorough determination of its hydrodynamic relationship to the downgradient wetland and creek.

The report concludes that runoff and near-surface groundwater discharge rates to the wetland would be expected to be maintained. This is based on the assumption that infiltration and runoff rates would not change once fill placement was completed. The report does prudently recommend that the fill material have consistency that is similar to the existing soils in order to maintain infiltration characteristics. However, the proposed depth of fill is in the order of 4 meters, and it will be compacted by heavy machinery after placement. Rates of infiltration are highly dependent on depth and porosity, which is in turn dependent on soil texture and also the degree to which soils have been disturbed and compacted. The assumption that infiltration patterns will remain the same as those prior to fill placement is not warranted at this time, even if there are efforts to retain consistency in soil texture.

Regarding soil texture, the report notes that "soil samples were not obtained or evaluated during the site visit". Instead, it relies on a quaternary geology report to conclude that soils are "sandy till". According to the Ontario Soil Survey Report, the soil in and around the project site is mainly Dumfries series, which is a stony, sandy loam till, derived from limestone and calcareous in nature. Characterizing the texture of existing soils is an important factor in assessing the movement and fate of water within the site. Equally, characterizing the texture of the fill material is also important. The information available for review does not contain any information regarding texture of the source fill

material. If the fill material is originating from depth (i.e. if it is subsoil), and from locations in the Peel plain, then it is most likely that those materials will be of finer consistency and different properties with respect to drainage and infiltration.

The soil chemistry may also be an important factor to consider. The quality of water moving from the site toward the wetland and the creek is dependent in part on the characteristics of the soil, and also the time that the water is resident within the soil. Water pH, hardness, and temperature are all potentially affected by the infiltration medium (soil or fill) and these can be critical factors to aquatic biota residing in streams or wetlands. Unless it can be reliably demonstrated that the fill material will not result in changes to the rate, volume, and quality of hydrological inputs originating form the fill area, then the risk of adverse effects on the wetland and stream must remain as a consideration in the overall risk-benefit analysis of the fill project.

The report also concludes that erosion and siltation would not be an issue under certain constraints (e.g. silt fencing). Mitigation measures can effectively preclude significant risks of siltation. However, there is also a meaningful potential for transport of soil particles from the fill area to nearby wetlands and streams as a result of atmospheric dispersion. Information on hand does not include any meaningful discussion of fugitive particulates or their mitigation (see further discussion regarding Air Quality).

In that a permit has been issued by Conservation Halton for fill project, as proposed, the CA has apparently concluded that the project will not affect the wetland (as required under Regulation 162/06. With due respect to Conservation Halton, if that conclusion is based solely on the LVM report, I respectively disagree with that conclusion, and thus the issuance of the permit. In my view, the assessment on file is simply inadequate in this regard.

There is another notable concern with the report's assumptions regarding infiltration to groundwater. The report infers (based on very limited observation) that bedrock is not fractured or weathered, and thus the water from the area proposed for fill placement does not infiltrate to groundwater. Rather, the report assumes that precipitation is trapped in the shallow soil layer above the bedrock, eventually draining along the bedrock layer toward the wetland.

The potential for infiltration to groundwater is a critical factor in context of understanding the potential impacts of the fill project on groundwater resources. The current characterization of infiltration is simply not rigorous enough for such a critical issue. An effective analysis would include, at a minimum, data obtained from a series of on-site boreholes (e.g. hydrogeological gradients), and a thorough characterization of residential wells in proximity to the site (e.g. depth of screening, distance from fill boundaries). While the town's Site Alteration By-law will require measures to detect contamination, those measures are not infallible, and there is always a risk of inadvertent delivery of contaminated fill. This being the case, the precautionary principal is advised, and a proper understanding of the potential influence of site activities on groundwater

resources is warranted. Such an understanding is simply not possible on the basis of information submitted to date.

Air Quality:

Any large scale operation involving transport, dumping and grading of geologic materials (e.g. fill) will generate some level of fugitive dust. The operation of heavy equipment in transport and grading will also generate combustion emissions, most likely from diesel fuel. These constitute sources of a number of atmospheric contaminants of concern (COC) that have the potential to affect human health. Suspended particulate matter would be one of the most likely COCs encountered in and around the fill project site.

The health effect of atmospheric particulate pollutants has received significant attention in recent years. This includes reviews by the World Health Organization[i], departments of the Canadian (e.g. CCME, Environment Canada and Health Canada) and U.S. governments (e.g. U.S, EPA), physician organizations (e.g. Physicians for Social Responsibility), and independent researchers (e.g. Anderson *et al*., 2012, and Pacal *et al*., 2013). While it is acknowledged that there is still much to learn, the current understanding of the health effects of atmospheric particulates can be summarized as follows:

- Atmospheric particulates are considered to be toxic substances,
- There is a clear dose-response relationship (i.e., the magnitude of health impact is proportional to the level of suspended particulates in air).
- Health effects can occur as a result of both chronic an acute exposure to atmospheric particulates.
- There is no identifiable "safe" level of respirable particulates. Any exposure that exceeds natural background (in the order of 5 µg/m3) introduces additional health risk.
- The establishment of atmospheric particulate standards (including those in Canada) has included considerations other than health, and the resulting standards do not completely mitigate the health risk.
- There is a general recognition that existing air quality objectives for atmospheric particulates need to be significantly lowered in order to be acceptable as pure health-based criteria

In regard to the generation of atmospheric particulates, the only point of relevance that has been identified in the material available for this review is a statement appearing in the information report PD-2015-05 from staff to council. The statement is that "dust control will be provided on an as required basis through the use of a water truck". If there is any reasonable concern about health effects of atmospheric particulates, a much greater level of diligence is required to characterize and mitigate the potential risk.

Noise:

Noise is an environmental stressor for which the scientific understanding of impacts and associated regulations for non-occupational settings are in the relatively early stages of their development. In general, the trend is toward treating noise as a form of contaminant that can have a range of adverse effects. Under Ontario Environmental Protection Act (EPA), consideration of noise as a contaminant would prohibit its "discharge" to the environment if it were to cause adverse effects, which would include health effects and loss or enjoyment or normal use of property. The potential for adverse effect is partly dependent on sound intensity and the duration of exposure, particularly in relative comparison to background noise levels. Health Canada provides guidance for the protection against environmental noise that includes measurable limits for increase in noise intensity relative to background.

In general recognition of the potential effects of noise at this time, municipalities may prohibit and regulate with respect to noise Under Section 129 of the ***Municipal Act.*** The Corporation of the Town of Puslinch does have a noise by-law (By-Law 5001-05). This by-law is based on the principal that "people have a right to and should be ensured an environment free from unusual, unnecessary or excessive sound or noise, which may degrade the quality and tranquility of their life"

In regard to noise associated with the fill project, the response to date is that a noise study is not required and that the hours of operation are in keeping with the Town's Noise by-law.

With all due respect, it is hard to accept that the scope and specifications of the Town's by-law were established in anticipation of large scale heavy machinery operation, more or less continuously over a duration of a year or more, in an otherwise very quite rural area. Further limiting is the fact that the existing by-law does not include any objective criteria (e.g. prohibiting sound that exceeds a certain measurable characteristics (intensity, frequency, etc.) that can be brought into consideration in the event of noise complaints.

Conclusions and Recommendations:

Although not technically designated as such, the project amounts to a large scale, long-term industrial operation, situated in very close proximity to residences and sensitive natural heritage features. If subject to the rationale that would typically apply in such a situation, the information that has been submitted to date would fall far short of what would be required.

By the strict letter of relevant policy and regulations, or more so lack thereof, council can take the position that for each possible issue of concern, the minimum requirements have been met. There is of course an obligation for the Township and its councilors to act in a manner consistent with the established policy and regulatory framework. Council should also be acting to ensure that decisions reflect the broader intent of overarching policy (e.g. the PPS or the County OP). All reasonable benefits and risks of any proposal should be understood and considered in a weight-of-evidence manner to ensure that the benefits of the proposed undertaking are not outweighed by the risks.

In regard to risk, there are a number of potential environmental and human health impacts that could be associated with the fill project in question, and should be considered in the risk-benefit context. This includes:

- potential impacts on the nearby wetland and stream as a result of quantitative and qualitative changes in infiltration and/or runoff,
- potential impacts on species at risk (SAR)
- potential impacts on human health and well being as a result of contaminated groundwater or air, and as a result of excessive noise.

Firm conclusions cannot be made at this time about the likelihood or severity of any of these potential impacts, but it is defensible to say that there are risks that should be considered. It is my opinion that the current policy and regulatory framework of current relevance to fill applications do not adequately consider the full range of risks. For those risks that do compel consideration in the current framework (i.e. effects on wetlands), the current state of assessment is deemed inadequate.

At this time, there is a very limited ability to understand the full environmental and human health risk associated with the fill project. It is advised that additional information be obtained to the extent warranted, regardless of any formal requirement to do so. This would include information equivalent to what would be generated through an Environmental Impact Study (EIS), a detailed hydrogeological study, a predictive air quality assessment, and a noise study.

In absence of new information, the precautionary approach would be to give more weight to the risks in the decision-making process.

In the event that the fill project is approved, there are various conditions and mitigation measures that should be considered for inclusion as part of the formal agreement between the proponent and the Township, or through other means. This would include:

- Provisions to ensure that textural and chemical characteristics of the source fill material is consistent with existing site soils
- Measures to identify conditions when site activity may result in significant dispersion of atmospheric dispersion towards nearby residences (e.g. instances of specific wind speed thresholds and directions)
- Provisions to directly assess air-borne particulates (e.g. dust fall monitors)
- Development of more detailed measures for dust control at source, including both mitigation and contingency measures (e.g. suspension of activity under specified conditions of increased risk)
- Long-term (minimum 10 years) monitoring of the quality and quantity of water in nearby residential wells, including effective baseline monitoring.
- Establishment of measurable criteria for excessive noise and a site-specific program for mitigation (sound barriers) or resolution of concerns as they may arise.
- Development of a rigorous quality assessment and control program, subject to peer review, and implementation of that program for the entire volume of fill proposed for the site, regardless of any jurisdictional considerations.
- Establish requirements for restoration that ensure ongoing protection of water resources (e.g. that the site be restored to a permanently vegetated state, and managed without use of herbicides or artificial fertilizers)

In absence of these measures, the overall level of risk to the environment and human health is not acceptable in my view.

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