BRITISH COLUMBIA

Environmental Appeal Board

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DECISION NOS. 2016-EMA-154(b), 155(c), 156(b), 157(b), 158(b), 159(b), 160(b), 161(b), 162(b), 164(b), 167(b), 168(b), 170(b), 171(b), 172(b), 173(b), 174(b), 176(b) and 178(b) [Group File 2016-EMA-G08].

In the matter of 19 appeals under section 100 of the *Environmental Management Act*, S.B.C. 2003, c. 53.

BETWEEN:	Don Tegart Isabel and Marc Brenzinger Siamak Zand Robert and Susan Enslen William C. Evans Joel Shaikin Brian D. Milne Christiana Shum Edward Bruce Maria T. Reeve Devra Faye Samson Jennifer Taylor Trevor Tso Lai Y.T. Lam Yuun Lam Arnold E. Shuchat Maria Carmen & Carlos P. Alfaro Christie S.M. Michel C. Alexandra Neufeld	**APPELLANTS**
AND:	District Director, Greater Vancouver Regional District	**RESPONDENT**
AND:	Harvest Fraser Richmond Organics Ltd.	**THIRD PARTY**
AND:	City of Richmond	**THIRD PARTY**
BEFORE:	A Panel of the Environmental Appeal Board: Norman E. Yates, Panel Chair Teresa Salamone, Member Howard Saunders, Member	
DATES:	September 7, 10-14, 19-21 and 24-25, 2018	
PLACE:	Richmond, BC	

APPEARING: For the Appellants:

Don Tegart	Not appearing
Isabel and Marc Brenzinger	Self Represented
Siamak Zand	Self Represented
Robert and Susan Enslen	Not appearing
William C. Evans	Not appearing
Joel Shaikin	Not appearing
Brian D. Milne	Not appearing
Christiana Shum	Not appearing
Edward Bruce	Not appearing
Maria T. Reeve	Self Represented
Devra Faye Samson	Not appearing
Jennifer Taylor	Not appearing
Trevor Tso	Not appearing
Lai Y.T. Lam	Not appearing
Yuun Lam	Not appearing
Arnold E. Shuchat	Self Represented
Maria Carmen & Carlos P. Alfaro	Not appearing
Christie S.M. Michel	Not appearing
C. Alexandra Neufeld	Not appearing
For the Respondent:	Gregory Nash, Counsel Alex Little, Counsel Scott Harcus, Counsel
For the Third Parties:	
Harvest Fraser Richmond Organics Ltd.	Sarah Hansen, Counsel Steven J. Evans, Counsel
City of Richmond	Simon R. Wells, Counsel

APPEALS

[1] The 19 appellants (the "Group Appellants") individually and collectively appeal the September 30, 2016, decision by Ray Robb, the District Director for the Greater Vancouver Regional District, now Metro Vancouver Regional District ("Metro Vancouver") [1]. The District Director's decision was to issue air permit no. GVA 1088 (the "Permit") to Harvest Fraser Richmond Organics Ltd., doing business as Harvest ("Harvest"), in relation to its composting operation located at 7028 York Road, Richmond, BC (the "Facility").

[2] The 19 appeals were grouped together for the purpose of a hearing under group file number 2016-EMA-G08, hereafter referred to as the "Group Appeals".

[3] The Board has the authority to hear these appeals under section 100(1) of the *Environmental Management Act*, S.B.C. 2003, c. 53 (the "*Act*"). The Board's

[1] The Greater Vancouver Regional District's name was changed to Metro Vancouver Regional District by Order in Council No. 023, Approved and Ordered January 30, 2017.

powers on an appeal are set out in section 103 of the *Act* which provides that, on an appeal, the Board may:

> (a) send the matter back to the person who made the decision, with directions,
>
> (b) confirm, reverse or vary the decision being appealed, or
>
> (c) make any decision that the person whose decision is appealed could have made, and that the appeal board considers appropriate in the circumstances.

[4] The Group Appeals are premised on arguments that the Permit should be reversed, varied, or sent back to the District Director with directions to impose more restrictive terms and conditions in the Permit in order to control the air emissions from Harvest's operations.

[5] The District Director (the Respondent in the appeals) maintains that the Permit was validly issued and that the appeals should be dismissed.

[6] The Permit Holder, Harvest, was added as a Third Party to the Group Appeals. It argues that the appeals ought to be dismissed.

[7] The City of Richmond ("Richmond") was also added as a Third Party to the Group Appeals. It is the municipality in which the permitted operation is located, and is the "direct democratic representative government body for the community". Richmond supports the issuance of the Permit for the protection of the environment, but also supports the Group Appellants' concerns about the odorous air emissions from Harvest's operation.

BACKGROUND

[8] The following background information is taken from the testimony and documents provided to the Panel and, except where stated, is not in dispute.

General Overview of Harvest's operation

[9] The Facility is situated on 28-acres of federally-owned land. The land is subject to a long-term lease from a federal agency known as the Vancouver Fraser Port Authority. The Facility processes compostable materials under a licence from the Greater Vancouver Sewerage and Drainage District. A permit is also required under the *Act* to authorize air emissions from the operation.

[10] The Permit authorizes the release of various air contaminants emitted from a number of specified locations at the Facility during the receiving and composting of organic materials. The composting process utilizes a combination of an enclosed anaerobic digesting system, two Covered Aerated Static Piles ("CASPs"), and open-air aging piles. The aging piles (to which composted materials are transferred from the CASPs), feed into screening piles and storage piles. The Facility sells composted soil material as end products. Most of the Facility is open to the air.

[11] The on-site enclosed system is known as the Energy Garden, which is an anaerobic composting system designed to break down commercial food waste. The

Energy Garden consists of a large warehouse-style receiving/mixing hall (the "Receiving Hall"), an Anaerobic Digester designed to produce biogas, and a Combined Heat and Power Unit that burns the biogas to produce electricity that can be added to "the grid" for use in the local community[2]. Residual gases may be burned in an emergency flare.

[12] The CASPs aerobically process organic material made up of yard waste (such as grass clippings and landscaping waste), waste from the residential "Green Bin" curbside collection (which consists of mixed food scraps and yard waste, referred to as "commingled waste"), the digestate generated by the Anaerobic Digester or otherwise processed with other compostables in the Receiving Hall, and packaged and unpackaged food waste.

[13] The screening piles are used for the final finishing of the compost, including the screening out of incompatible materials such as pieces of wood and plastic. The completed product is then placed in piles for storage awaiting sale.

[14] Biofilters are used to oxidize and remove odours and other air contaminants emitted from the CASPs, the finished compost screening pile, and the Energy Garden.

Facility history

[15] The Facility began operating in 1993 under a different name and owner. It was purchased in 2009 by Fraser Richmond Soil and Fibre Ltd., and subsequently renamed and came to be known as Harvest or Harvest Fraser.

[16] In 2010, the Federal Government performed an environmental assessment study, gave its approval for the Energy Garden, and subsequently provided funding in support of the operations. Harvest applied to the District Director for an air emissions permit in February 2012, which resulted in air permit GVA 1054, issued in May 2013 and valid until June 30, 2015 (the "previous Permit"). The previous Permit authorized the discharge of air contaminants from 10 emission sources at the Facility, and set limits on those emissions, including volatile organic compounds and various odour-producing chemicals. Along with monitoring and reporting requirements, the previous Permit contained a condition that no odours were to go beyond the plant boundary "such that the District Director determines that pollution occurs".

[17] On January 26, 2015, Fraser Richmond Soil and Fibre Ltd. submitted an application to renew the previous Permit for a 10-year term, and to change the name of the permitted entity to Harvest Fraser Richmond Organics Ltd. (doing business as Harvest). The permit renewal process turned into a lengthy review and public consultation process during which the previous Permit expired and three temporary approvals were issued, enabling Harvest to continue operations between permits.

[2] Biogas refers to a mixture of different gases produced by the breakdown of organic matter in the absence of oxygen: https://en.wikipedia.org/wiki/Biogas

[18] During that interim period, Harvest's operation was at its peak. It received and processed as much as 240,000 tonnes of organic material annually from 13 communities within Metro Vancouver and upwards of 100 commercial and institutional customers (such as landscaping businesses, restaurants and grocery stores). Also during that interim period, Metro Vancouver received a substantial number of public complaints regarding offensive odours attributed to Harvest's operations. Some were from residents who lived in close proximity to the Facility; others came from residents at locations several kilometres away. The number of complaints varied from month-to-month, and increased significantly from the spring of 2015 through the summer and fall of 2016.

[19] Testimony at the hearing described odour issues at Harvest up to and during the fall of 2016 that were likely due to too much material on site, wet weather, and an increase in the volume of food waste being processed. According to Harvest, the increase in food waste received at Harvest was associated with regulatory changes and surcharges for organic wastes that had been imposed on area solid waste landfills. Harvest said that communities who pride themselves on "being green" go through an adjustment period for this sort of thing. Specifically, Harvest surmised that the operational issues during that period were, in large measure, because existing staff and equipment had difficulty keeping up with the volume of incoming waste, and there was insufficient airflow through the CASPs which induced anaerobic decomposition, producing odours. Several changes were made to the CASPs in terms of controlling moisture, temperature, pH and oxygen content of the piles as a way to address the risk of anaerobic conditions.

[20] Harvest took the electricity-generating potential of the Energy Garden out of operation in the fall of 2016, apparently a corporate business decision, but the Receiving Hall continued to be used to receive bulk and packaged commercial food waste. The food waste is mixed with green landscaping waste or commingled waste in the Receiving Hall before it gets incorporated into the CASPs. Harvest also took one of two CASPs out of operation in June 2018.

The Permit

[21] The consultation process on the application to renew the previous Permit included discussions about the specific odour control works that Harvest was prepared to implement to address air contaminants. It also included a public meeting in March of 2016. Between April and August of 2016, Harvest submitted 9 "supplements" to its permit application, and Metro Vancouver provided 4 draft permits to Harvest for comment.

[22] On September 30, 2016, the District Director issued the Permit pursuant to the Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008 (the "*Bylaw*") and the *Act*. The Permit authorizes the emission of air contaminants from the Facility. The Permit is valid until April 30, 2020.

[23] The Permit specifically authorizes and regulates the discharge of air contaminants from 10 emission sources at the Facility. Similar to its predecessor, the Permit sets limits for air emissions at the specific emission sources, sets a deadline for establishing emission limits for other compounds at the sources, and

specifies activities intended to prevent odour. However, the Permit allows higher levels of certain emissions than were allowed under the previous Permit.

[24] Unlike the previous Permit, the Permit allows and sets limits for hydrogen sulphide and ammonia emissions. The Permit also requires the west CASP and biofilter to be replaced or taken out of service by June 1, 2018 (emission source 05), and the east CASP to be replaced or taken out of service by June 1, 2019 (emission source 06).

[25] The Permit contemplates that emission quality limits "as approved by the District Director" will take effect by January 31, 2020, for total aldehydes, total ketones, total amines, total ammonia, total reduced sulphur compounds, total organic sulphur compounds, total volatile fatty acids, and other air contaminants (collectively, "Odorous Compounds") for the Energy Garden, the CASPs, and the finished compost screening area.

[26] The Permit also regulates emissions resulting from storage piles during waste receipt and handling, with time limits for preparation and placement of waste materials. The Permit limits the amount of "commingled waste" that can be accepted at the receiving area from June 1 to October 31 in 2017 and 2018.

[27] In addition to regulating emissions from specific sources, the Permit also includes a new provision to address Facility-wide emissions detectable in the community, referred to by Harvest as "the Sniff Test". According to this provision, the District Director "will monitor malodorous impacts of air contaminants emitted from the Facility at the distances specified in Table 1". If the District Director determines that the malodorous impact from the Facility's air contaminant emissions "exceeds the limits specified in Table 1", then:

> the Facility must immediately stop receiving, for placement on any CASP, any food waste, including commingled food and yard waste, until such time as the District Director determines that the source of malodours has been addressed. (Permit, page 16)

[28] The Sniff Test is premised on observations of unacceptable malodours attributed to Harvest for at least 10 minutes in any hour, at the specified distances, taking wind direction into account. Table 1 specifies the distance from the Facility and the maximum days of malodour[3] permissible in any 14-day period as follows:

[3] The Panel notes that the words "malodorous", "malodour", "malodours", are not defined in the *Act*, the *Bylaw* or the Permit. The District Director's Statement of Points states that "defining the term malodour in the Permit is unnecessary for the following reasons: (a) The word has a widely understood common meaning (i.e., foul or unpleasant smell); and (b) Harvest has acknowledged that the Facility is capable of producing and does produce malodorous substances." Pages 23-24.

Calendar Year	Distance from Facility Fenceline	Maximum allowed number of days of malodour from Facility in any 14 day period
2017	5 kilometres	4 days
2018	4 kilometres	3 days
2019	3 kilometres	2 days

[29] The Permit also requires dispersion modelling of certain air contaminants and specifies detailed emission testing and reporting requirements, including requirements for Harvest to sample some of its emission sources and report on Odour Concentrations, as well as to prepare various plans for the continued operation of the Facility and to keep various operating records.

[30] The Permit states that the District Director may require Harvest to undertake source testing at one or more of the 10 specified sources to determine the quantity of emissions in Odour Units, if the District Director determines that "over a 7 day period an excessive number of complaints received by Metro Vancouver are attributable to the Facility, based on the balance of probabilities, and an approved Metro Vancouver staff member observes malodours from the Facility at a distance of five kilometres on two or more days within that 7 day period".[4] (Odour Units will be described in more detail later in this Decision.)

The Appeals

[31] Twenty-three individuals initially appealed the decision to issue the Permit; four withdrew their appeals prior to the hearing.

[32] The Group Appellants are all residents of Richmond or surrounding municipalities. In general, they appeal the Permit on the basis that unpleasant odours from the Facility interfere with their ability to enjoy breathing fresh air where they live, recreate and work. The Appellants describe the odour in extreme terms such as "nauseating", "rancid", and "like rotting garbage". Many allege that the Facility operates in a manner that causes pollution to the environment, contrary to the Permit, the *Bylaw* and the *Act*, and that Metro Vancouver is not adequately monitoring and enforcing the Permit. A majority believe that the emission limits in the Permit are either being exceeded, or are inadequate to begin with.

[33] A number of the Group Appellants identify health issues and related symptoms, which they believe are a direct result of the air contaminants (toxic compounds) and/or resulting odour from the Facility. Many are concerned that the

[4] One definition of an Odour Unit is "the quantity of any odorous substance or of any given mixture of odorous substances which, when completely dispersed in one cubic foot of odor-free air, produces a median threshold odor detection response in humans." (John L. Mills , Robert T. Walsh , Karl D. Luedtke & Lewis K. Smith (1963) *Quantitative Odor Measurement, Journal of the Air Pollution Control Association*, 13:10, 467-475, DOI: 10.1080/00022470.1963.10468207).

long-term adverse health effects of the contaminants being emitted, and the resulting odour, have not been studied and are, therefore, unknown.

[34] Specific concerns with the permitted contaminants and the Permit conditions include the following:

- Given the number of complaints and health concerns identified by the public in relation to the previous Permit, and while the temporary approvals were in effect, the Permit should not have been issued.
- The previous Permit specifically prohibited odours beyond the plant Facility boundary "such that the District Director determines that pollution occurs". The perimeter distances specified in Table 1 to monitor malodour are insufficient to determine whether the Facility is causing pollution.
- Malodour attributed to the Facility has significantly worsened over the past 4 years (that is, prior to October 1, 2016) despite the terms of the Permit and the previous Permit.
- Table 1 in the Permit does not prevent pollution to the environment (namely, air) in the community. Table 1 is based on a misunderstanding of the nature of the air contamination problem, and the perimeter distances are unrealistic.
- Table 1 "legalizes" pollution within 5, 4 or 3 kilometres of the Facility (the perimeter distances in Table 1 for detecting unacceptable malodour under the Sniff Test).
- Table 1 is based on incorrect assumptions that air contaminants travel in a linear fashion. The residents' experiences show that air contaminants disperse in an unpredictable pattern.
- The Permit allows the Facility to emit more sulphur oxides, volatile organic compounds, and other malodorous contaminants than under the previous Permit. Further, airborne toxics and volatile organic compounds can cause adverse health impacts.
- The Permit contains too much discretion ("escape clauses") whereby Harvest can circumvent the permitted emission limits and controls.

[35] Many of the Group Appellants seek to have the Permit rescinded on the grounds that the Facility is unable to prevent pollution, as evidenced by the significant complaints of odour created by its operations.

[36] In the alternative, some of the Group Appellants request that Table 1 (distances for malodour detection and maximum number of days of malodour) be rescinded or varied to shorter distances and fewer days. One Appellant also asks the Board to order a "new assessment of odour impact" to ensure that any new terms added to the Permit are based on "solid scientific interpretation of the content, toxicity, and displacement of the gases emanated" from the Facility.[5]

[5] Alfaro Notice of Appeal, page 3.

[37] Additional alternative remedies requested by the Group Appellants include: adding emission limits to certain sources (emission sources 7, 9 & 10), reducing allowable emissions to less than – or equal to – those in the previous Permit, specifying flow rates and the allowable emission limits in total tonnes per year, requiring better operating practices at the Facility to reduce air contaminants, requiring health studies to ensure that there are no long-term adverse impacts from the contaminants (and the resulting odour) on human health, relocating or enclosing the Facility, adding additional filters or other improvements at the Facility to reduce pollution, strengthening the monitoring and enforcement of Harvest's compliance with Permit terms and the prevention of pollution, and changing the expiration date to September 2018 rather than 2020.

[38] Prior to the hearing, one of the Appellants applied for a stay of the Permit. This application was denied on June 20, 2017 (see *Isabel and Marc Brenzinger v. District Director*, *Environmental Management Act*, (Decision No. 2016-EMA-155(b)).

[39] In response to the Group Appeals, the District Director submits that the appeals ought to be dismissed. The District Director submits that he considered all relevant factors, included terms and conditions considered advisable for the protection of the environment, and issued the Permit in accordance with his legislative authority.

[40] Richmond supports the issuance of the Permit as a valid and reasonable exercise of the District Director's jurisdiction dealing with environmental protection. However, it also supports the community concerns about the odorous emissions from the Facility, and submits that such emissions must be effectively regulated in the public interest. Richmond submits that, if the Facility is to remain in the community, it must sufficiently reduce the odours to eliminate their adverse impacts on the community.

[41] As permit holder, Harvest submits that many of the Permit requirements protect the environment (for example, the emission limits on volatile organic compounds) and that the Permit was properly issued. Harvest states that it applied for the new Permit based on actual emission figures and modeling as opposed to the hypothetical figures that were used in the previous Permit. It notes that the District Director did not accept Harvest's actual emission levels in issuing the Permit; rather, the permitted concentration limits are less than those applied for. Harvest further points out that, if it exceeds those emission concentrations, the District Director is at liberty to issue a Notice of Violation under the *Greater Vancouver Regional District Ticket Information Utilization Bylaw No. 1050, 2006*. It submits that this acts as a significant deterrent, compelling Harvest to comply with the permitted emissions concentrations. There are also other enforcement options.

[42] Harvest further submits that any odours that have been emitted from the Facility have been reasonably mitigated. It submits that it has met the emission concentration limits specified in the Permit, and that the odours complained of by members of the public may be coming from other sources near the Facility.

[43] Harvest further submits that there is insufficient proof, on a balance of probabilities, that the health impacts reported by some of the Group Appellants can be attributed to the Facility.

[44] Finally, Harvest maintains that the benefits from the Facility outweigh the minimal impact of some odour that may be attributed to the Facility.

[45] Of note, in addition to being a Third Party to the Group Appeals, Harvest filed its own appeal of the District Director's decision to issue the Permit (Appeal No. 2016-EMA-175). Harvest appealed the Permit on different grounds than those raised by the Group Appellants. In particular, Harvest appealed on the ground that the method set out in the Permit for determining compliance with permitted odour emissions (namely, the Sniff Test) was unreasonable, and applied for a stay of that portion of the Permit. Harvest also challenged the Permit on constitutional grounds. The Board decided the stay on April 4, 2017 (*Harvest Fraser Richmond Organics Ltd*. v. *District Director, Environmental Management Act*, (Decision Nos. 2016-EMA-0175(a)), and the constitutional issue on May 12, 2017 (*Harvest Fraser Richmond Organics Ltd. v. District Director, Environmental Management Act*, (Decision Nos. 2016-EMA-175(b) and 2016-EMA-G08(a)).

[46] The Board scheduled the Group Appeals and Harvest's appeal to be heard together because of the overlapping nature of the appeals (the "Joint Appeals"). Of note, Harvest was added as a Third Party to the Group Appeals given that it is directly affected by the Board's decisions, and the City of Richmond ("Richmond") is a Third Party to all of the appeals because of its interest in the subject matter. As will be discussed below, Harvest's appeal was resolved during the hearing of the Joint Appeals.

The Hearing

[47] The hearing of the Joint Appeals was scheduled for four weeks, commencing on September 4, 2018. It is noteworthy that, less than two weeks prior to the commencement of the hearing, Harvest announced its intention to stop receiving any food waste by April 1, 2019, including commingled waste, and to stop using (and not replace) the remaining CASP after June 1, 2019.

[48] Also of note, after the formal commencement of the hearing, the parties were invited to collectively participate in a mediation facilitated by a Board member who was not a member of this Panel. The hearing was temporarily adjourned while those discussions took place. That negotiation process resulted in a settlement reached by Harvest, the District Director, and Richmond, that was reflected in a consent order amending the Permit (the "Amended Permit"). The Amended Permit forms the basis of the companion decision on Harvest's appeal and is appended as Schedule "A" to this decision.

[49] Among other things, the Amended Permit deleted the authorization for the west CASP (emission source 05) that had already been taken out of operation in June of 2018, such that replacement of that CASP is no longer an option. The Amended Permit also added another receiving area as an emission source for air contaminants and narrowed the parameters for the Sniff Test that had been central to Harvest's appeal. The Sniff Test was also amended to state that the District Director will monitor malodorous impacts of air contaminants emitted from the Facility at "or beyond" the distances specified in Table 1, and that the April 1, 2019

distance for monitoring was reduced from 3 kilometres to the "Nearest occupied residence".

[50] The Amended Permit also prescribes a Maximum Emission Quality, namely: "No odours past the plant boundary such that pollution occurs" for each emission source.

[51] Finally, the Amended Permit provides that "no less than 90 days prior to restarting the Anaerobic Digester", Harvest would be required to submit a permit amendment application, a revised written Digestate Odour Mitigation Plan, and a written proposal recommending emission limits for specific air contaminants from the Energy Garden biofilter supported by dispersion modeling (see Amended Permit at page 34). The District Director confirmed for the Panel that public consultation would be an integral element of any permit amendment application.

[52] The Amended Permit has the same expiry date as the Permit (April 30, 2020).

[53] As a result of the settlement and Amended Permit, Harvest's appeal was resolved to the satisfaction of Harvest, the District Director, and Richmond; however, the concerns of the Group Appellants were not resolved. A resolution to the collective satisfaction of the Group Appellants would have been the end of the Joint Appeals.

[54] When the hearing resumed the consent order, attaching the Amended Permit, was marked as Exhibit A for identification in the Group Appeals. The original Permit was still the focus of the Group Appeals on the understanding that the Panel would also hear evidence and submissions relevant to the Amended Permit. The parties agreed that, based on the evidence and submissions in the Group Appeals, the Panel could modify the Amended Permit. The hearing of the Group Appeals proceeded on this basis.

[55] The Board conducted the Group Appeals as a "new hearing" pursuant to its authority under section 102 of the *Act*. This allowed the Panel to hear evidence and argument that was not before the District Director when he made the decision to issue the Permit. The Panel heard evidence over 11 days from 19 witnesses, followed by a day of submissions.

[56] Only four of the Group Appellants attended some or all of the hearing; namely, Mr. Zand, Ms. Brenzinger, Ms. Reeve, and Mr. Shuchat – all of who testified, except for Ms. Reeve. In addition, Mr. Shuchat called five witnesses and Mr. Zand called two witnesses.

[57] The District Director, Ray Robb, testified in the Group Appeals.

[58] Richmond produced an expert report prepared by Dillon Consulting Ltd. ("Dillon Consulting") and called four employees from Dillon Consulting to testify.

[59] Harvest called evidence from one corporate witness and three expert witnesses.

[60] Although only a small number of the Group Appellants actively took part in the hearing, the Panel Chairman had previously agreed to consider the concerns of all of the individuals who filed Notices of Appeal, whether they attended the hearing

or offered testimony (and provided they had not discontinued their appeals).[6] Having filed their appeals individually and collectively, the testimony presented by those four Group Appellants at the hearing has been attributed to all of the Group Appellants.

[61] As noted, the Panel has decided the Group Appeals and Harvest's appeal in separate, but companion, decisions. The Panel's decision on Harvest's appeal was released concurrently with this Decision: see *Harvest Fraser Richmond Organics Ltd. v. District Director, Greater Vancouver Regional District*, (Decision No. 2016-EMA-175(c), May 21, 2019).

ISSUES

[62] To decide the Group Appeals, the Panel has considered the following issues:

1. What is the District Director's authority to regulate air emissions and odour in a permit? What is the threshold or test to be met in order to revise or rescind the Permit or a provision in the Permit on the basis of odour?
2. Does the evidence meet this threshold or test? To decide this, the Panel has considered;
    a. how odour was addressed in the District Director's decision-making process, and
    b. the evidence regarding characterization of the odour attributed to Harvest, and how far away from the Facility (and how often) it was detected.
3. If the threshold or test has been met by the Group Appellants, what is the appropriate remedy in the circumstances? More specifically, what is the appropriate remedy given the terms of the Amended Permit?
4. Is Metro Vancouver's process for receiving and investigating complaints about odour from the Facility reasonable and appropriate?
5. Given the planned changes to the Facility's operations, and the terms of the Amended Permit, are any further terms or conditions required in order to manage or address odorous air contaminants?

DISCUSSION AND ANALYSIS

1. What is the District Director's authority to regulate air emissions and odour in a permit? What is the threshold or test to be met in order to revise or rescind the Permit or a provision in the Permit on the basis of odour?

[63] The *Act* is the cornerstone legislation that regulates waste management in BC, including the discharge of air contaminants.

[64] Among other things, section 31 of the *Act* authorizes Metro Vancouver to regulate air quality and generally manage pollution within its boundaries, including

[6] Pre-hearing teleconferences, August 9 and 23, 2018

appointing a district director to oversee these activities and officers who are empowered to perform compliance and enforcement activities. Section 31 of the *Act* provides as follows [emphasis added]:

Control of air contaminants in Greater Vancouver

31(1) Despite anything in its letters patent, the Metro Vancouver Regional District may provide the service of air pollution control and air quality management and, for that purpose, the board *of the regional district may, by Bylaw, prohibit, regulate and otherwise control and prevent the discharge of air contaminants*.

(2) The board of *the Metro Vancouver Regional District must appoint*

(a) officers who may, with respect to the discharge of air contaminants in the Metro Vancouver Regional District, exercise all the powers of an officer under section 109 [entry on property] and the regulations, and

(b) *a district director* and one or more assistant district directors *who may, with respect to the discharge of air contaminants in the Metro Vancouver Regional District, exercise all the powers of a director under this Act*.

[65] The BC Supreme Court has previously confirmed that the *Act* delegates authority to the regional district to legislate with respect to air quality: see *Greater Vancouver (Regional District) v. Darvonda Nurseries Ltd.*, 2008 BCSC 1251 (at paragraphs 20-21).

[66] Pursuant to its authority under section 31(1) the *Act*, Metro Vancouver's predecessor (Greater Vancouver Regional District) adopted the *Bylaw* to regulate air contaminants in the Metro Vancouver area. Many of the provisions of the *Bylaw* effectively mirror provisions in the *Act*, including relevant definitions, general prohibitions, approval and permitting provisions, and permit amendment processes. In this decision, subsequent references to applicable legislative provisions will be to the *Bylaw*.

[67] Section 3 of the *Bylaw* includes the following definitions relevant to the appeals:

> "air contaminant" means any substance that is emitted into the air and that
>
> (a) injures or is capable of injuring the health or safety of a person;
>
> (b) injures or is capable of injuring property or any life form;
>
> (c) interferes or is capable of interfering with visibility;
>
> (d) interferes or is capable of interfering with the normal conduct of business;
>
> (e) causes or is capable of causing material physical discomfort to a person; or
>
> (f) damages or is capable of damaging the environment.

> ...
>
> "environment" means air, land, water and all other external conditions or influences under which humans, animals and plants live or are developed.
>
> ...
>
> "pollution" means the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment.

[68] Subsection 3(3) of the *Bylaw* states that:

> (3) For the purposes of the definition of an air contaminant, it is not necessary to prove:
>
> (a) that the air contaminant, if diluted at or subsequent to the point of discharge, continues to be capable of harming, injuring or damaging a person, life form, property or the environment, or
>
> (b) the actual presence of a person who, or a life form that, is capable of being harmed or injured by the discharge of the air contaminant.

[69] The *Bylaw* also contains general prohibitions against discharging air contaminants. The relevant sections of the *Bylaw* read as follows [emphasis added]:

> PROHIBITIONS
>
> 5 Subject to section 7, *no person may* in the course of conducting an industry, trade or business of whatsoever kind or nature *discharge or allow or cause the discharge of any air contaminant*.
>
> 6 Subject to section 7, no person may dispose of waste by incineration or burning.
>
> 7 Subject to section 10, *nothing in section 5 or 6 prohibits the discharge of an air contaminant where*
>
> (1) the discharge is conducted strictly in accordance with the terms and conditions of an emission regulation;
>
> (2) *the discharge is conducted strictly in accordance with the terms and conditions of a valid and subsisting permit*, approval or order;
>
> ...
>
> 10 Notwithstanding any other provision in this *Bylaw no person may discharge or allow or cause the discharge of any air contaminant so as to cause pollution*.

[70] Permits may be issued under section 11 of the *Bylaw*, as follows [emphasis added]:

PERMITS AND APPROVALS

Permits

11 The *district director may issue a permit* to allow the discharge of an air contaminant *subject to requirements for the protection of the environment that the district director considers advisable* and without limiting the generality of the foregoing the district director may do one or more of the following in the permit:

(1) *place limits and restrictions* on the quantity, frequency and *nature of an air contaminant permitted to be discharged* and the term for which such discharge may occur;

(2) require the holder of a permit to repair, alter, remove, improve or add to works or to construct new works and to submit plans and specifications for works specified in the permit;

(3) require the holder of a permit to give security in the amount and form and subject to conditions the district director specifies;

(4) require the holder of a permit to *monitor*, in the manner specified by the district director, an air contaminant, the method of discharging the air contaminant *and the places and things that the district director considers will be affected* by the discharge of the air contaminant;

(5) require the holder of a permit to conduct studies, keep records and *to report information* specified by the district director in the manner specified by the district director;

(6) specify procedures for sampling, monitoring and analyses, and *procedures or requirements respecting the discharge of an air contaminant* that the holder of a permit must fulfill.

[71] The District Director also has broad authority under section 28 of the *Bylaw* to order a person to take steps in advance to prevent pollution (Pollution Prevention Orders) and, under section 29, to stop the cause of pollution (Pollution Abatement Orders).

[72] The District Director notes that section 11 of the *Bylaw* authorizes him to issue a permit subject to requirements that he considers "advisable" for the protection of the environment. He submits those words mean that the discharge of air contaminants that are harmful to the environment "is minimized to the greatest extent reasonably possible", which requires balancing the potential for harm caused by the discharge of air contaminants against the cost of avoiding harm, in a manner that is in the broad public interest. In his view, banning all air contaminants is not in the public interest, since virtually no activity would be allowed.

[73] When considering an air discharge permit, the District Director submits that "malodour" – defined by the District Director as a foul and unpleasant smell – has a clear connection to the terms "air contaminant" and "pollution" as defined in the *Bylaw*. According to the District Director, it follows that regulating malodour has an

obvious relationship to the "protection of the environment". In particular, the District Director submits that section 11(1) of the *Bylaw* enables him to place limits and restrictions on the "quantity, frequency and *nature of an air contaminant* permitted to be discharged and the term for which such discharge may occur". By reference to section 3 of the *Bylaw*, the District Director submits that, because the nature of an air contaminant includes its odour, he has the authority to place limits and restrictions on odours where an odour "injures or is *capable* of injuring the health or safety of a person", "interferes or is capable of interfering with the normal conduct of business", or is "capable of causing material physical discomfort to a person."

[74] Noting that the *Bylaw* defines "pollution" as "the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment", the District Director submits that, since the nature or quality of a substance includes its odour, the "odour" of a substance may substantially alter or impair the usefulness of the environment and, therefore, be – or be evidence of – pollution.

[75] The District Director further notes that the enumerated list in section 11 (specifying his permitting authority, *infra*) is not exhaustive because it is preceded by the phrase "without limiting the generality of the foregoing". The District Director also points to his authority to issue Pollution Abatement Orders under section 29 of the *Bylaw,* granting him discretion to prevent and stop pollution, including requiring the adjustment or alteration of industrial processes that may cause the release of an air contaminant.

[76] By this reasoning, the District Director submits that the *Bylaw* provides authority for him to address odour in a permit and to use odour to determine whether pollution is occurring or has occurred.

[77] Harvest does not dispute that the District Director has jurisdiction to address odour under section 11 of the *Bylaw*. However, Harvest disagrees that its Facility is the source of the odours complained of, and/or that its emissions are affecting people's health or causing pollution. These matters are addressed as a separate issue below.

[78] The Panel notes that the Group Appellants and Richmond did not make submissions directly on this interpretation issue.

The Panel's findings

[79] The Panel agrees that the *Bylaw* allows the District Director to authorize and regulate the discharge of air contaminants within the regional district under a permit, provided that the authorized discharge does not cause pollution (as defined). When exercising this authority, section 11 of the *Bylaw* states that a district director may include any requirements that he or she "considers advisable" for the "protection of the environment". This is a subjective assessment.

[80] While it has generally been accepted by the Board that odour is not a "substance" and therefore does not meet the definition of "air contaminant" or "pollution" in and of itself, this does not mean that odour is not a relevant or

important consideration. In *Surrey Langley Environmental Protection Society et al. v. Assistant Air Quality Director*, *(*Appeal No. 95/39 – Waste, August 12, 1996) [*Surrey Langley*], the Board found that, although odour is not a "substance", it can be evidence of pollution. That case dealt with malodours from a mushroom farm. The Board reasoned (at page 10):

> While the definition of pollution contemplates a "thing" - the presence in the environment of substances or contaminants (a contaminant in turn is defined as a substance) - and an odor may not be a thing but rather the effect on the human nose of a "thing", it would be supercilious to suggest that because the focus is on the effect of the thing rather than on the thing itself that hence we are not dealing with pollution.
>
> Quite correctly an odor is not a "substance", rather it is the interaction of a substance with the olfactory senses. It is a property of a substance - a consequence. The odors are what is caused by substances in the environment.
>
> …
>
> The recording of odors from the [Money's Mushroom] Facility was a method used by the Respondent to determine whether or not the Facility was causing pollution. The human nose is the instrument by which the presence of substances is detected. It is not to be dismissed as an instrument for measuring the presence of "substances". The Panel does not accept the proposition that it is necessary to identify or isolate the existence of particular substances in the environment in order to establish air pollution.

[81] In that case, the Board found that Money's Mushrooms Ltd.'s composting facility had caused air pollution based on the evidence of odour in the community, and confirmed the decision-maker's finding in that regard.

[82] The Panel also agrees with the District Director that odour may be addressed in a permit. Section 11(1) expressly allows limits and restrictions to be placed on "the quantity, frequency and *nature* of the air contaminants to be discharged". Further, section 11(4) allows a district director to require the permit holder to monitor, in the manner specified by the district director, "the places and things that the district director considers will be affected by the discharge of the air contaminant". This can include monitoring odour in the community to determine whether the permitted emissions are damaging human health (one of the concerns identified in the definition of air contaminants), the environment and/or causing pollution. In *West Coast Reduction Ltd. v. District Director of the Greater Vancouver Regional District*, (2007-EMA-007(a); 2008-EMA-005(a), March 8, 2010) [*West Coast Reduction*], the Board accepted the above-noted quote from *Surrey Langley* and held as follows (at paragraph 246, emphasis added):

> … As in *Surrey Langley*, the District Director may use his authority to require that odours be monitored to determine whether they are causing air pollution. *This information can then be used to assist in the identification of the substance that is the source of the "air*

> *contaminant." Once the source is identified it can specifically be regulated, thus bringing the air pollution to a stop*.

[83] The Panel agrees with and adopts the Board's finding in *Surrey Langley* that odour in the environment may be evidence of pollution. Similarly, odour in a community may be used to determine whether permit terms are adequately protecting human health and the environment. However, the fact that odour may be used to establish pollution or a failure to protect health or the environment does not address the threshold question of when can odour be the basis for either rescinding a permit or varying its terms.

[84] The Panel is of the view that, once a permit is issued, the legislative scheme is such that the Board should not rescind the permit in its entirety unless there is no way to revise the permit to cure the defects, or the decision-making process was fundamentally flawed. For example, if the permitted operation may cause pollution that cannot be cured by adding terms to protect the environment, or if a permit was issued without authority under the *Bylaw* (or the *Act*). In addition, section 21 of the *Bylaw* provides the grounds for which the District Director might suspend or cancel a permit. The various legislative provisions available to address compliance issues and to prevent or abate pollution, also support this finding. These tools, in addition to permit amendments, give the regulator and the permit holder an opportunity to correct problems as they arise. Rescission of an otherwise validly issued permit should be a last resort and, obviously, would have potentially significant consequences.

[85] For the Board to rescind or vary a term or condition of a permit on the basis of odour, the Panel finds that the same considerations apply as those applied by a district director under section 11 of the *Bylaw*: taking action to rescind or vary the term must be advisable for the protection of human health and the environment, and must not cause pollution. As is always the case, the term must also be lawful: it cannot be outside of the jurisdiction of the legislation, unreasonable, or based on irrelevant or erroneous considerations.

[86] Finally, an appellant has the onus of providing sufficient evidence to establish, on a balance of probabilities, that the terms of a permit are not sufficiently protective of human health or the environment, or that they cause pollution. When considering the evidence, the Panel also adopts the Board's approach in *Emily Toews & Elisabeth Stannus v. Director, Environmental Management Act*, (Decision Nos. 2013-EMA-007(g) and 2013-EMA-010(g), December 23, 2015) [*Toews & Stannus*]. In that case, the Board found that, when considering whether to authorize air contaminants in a permit (or, in that case, a permit amendment):

> 235. … a cautious and technically rigorous approach should be taken when assessing the potential risks of injury to human health or damage to the environment. Harm or damage that may be caused by the emissions should be controlled, ameliorated and, where possible, eliminated. However, not all harm or damage will be eliminated, given that the permitted emission of "air contaminants", by its very definition, includes substances that are capable of causing injury to human health and/or damage to the environment.

2. Does the evidence meet this threshold or test; i.e., does the Permit sufficiently protect human health and the environment, and prevent pollution?

[87] Before addressing this issue, it is helpful to understand the context in which the Permit was issued and the District Director's decision-making process.

a) The decision-making process

[88] Mr. Robb testified on his own behalf at the hearing. Among other things, he described Metro Vancouver's policies and procedures for issuing permits and the monitoring and enforcement programs implemented by Metro Vancouver.

[89] Mr. Robb provided a brief history of Harvest's May 2014 transition from a business that only took in compostable, green yard waste to a business that also took in food waste. In his view, this transition to food waste corresponded with a subsequent increase in odour complaints from the community: the number of Harvest-related complaints went from 250 in 2015 to 2,300 in 2016.

[90] Mr. Robb states that he considered those complaints and attempted to address the underlying issues in the Permit. He explained how air dispersion modelling is used to predict how air contaminants will behave, and the accordant role of the regional health authority in that process. He described the Richmond area as being relatively complex for modelling due to diurnal variation in airflow and temperature gradients. He testified that reducing malodorous emissions at the source results in a proportionate reduction in corresponding odours relative to an observer's proximity away from the source.

[91] When considering how to measure and address odour in the Permit, Mr. Robb said that there are no instruments that reliably detect odours (as compared to detecting chemicals that cause odours). Thus, he added the "Sniff Test" to the Permit.

[92] According to Mr. Robb, the Sniff Test requires malodour to be detected and recognized as a malodour originating from the Facility at the distances prescribed in Table 1. He and other Metro Vancouver staff developed a strategy, referred to as the "Officer Odour Observation Protocol for Harvest Fraser", to assist enforcement officers in their determination of whether, and at what level of intensity, odour is being emitted from the Facility. This protocol was last updated on January 1, 2018, with plans to update it annually. Under the protocol, the officer conducting an odour assessment records his or her findings in a declaration. When multiple times and locations are investigated, officers file "Odour Survey Summary" reports containing a spread sheet with the start and stop times, locations, characters, odour intensity ranges, hedonic tone ranges, Scentroid[7] Odour Units (if available), as well as wind direction and speed.

[7] Scentroid is a brand name olfactometer; an in-field device used to detect and measure odour dilution.

[93] Mr. Robb explained that, if the malodorous impact of emissions exceeds the Table 1 limits, Harvest must stop receiving food waste and commingled waste until such time as the District Director determines that adequate measures have been taken to address the cause of the malodour observations. The Permit is premised on reducing potential impacts to the community from air emissions, while meeting the needs of the community by processing compostable materials.

[94] In addition to the Sniff Test, Mr. Robb included a number of other requirements in the Permit to address the emission of odorous air contaminants from the Facility, as previously mentioned in the background to this Decision.

[95] Mr. Robb testified that he considered the potential for adverse health impacts from the emissions and that Metro Vancouver, in conjunction with local health authorities, determined that air contaminant emissions from the Facility did not raise health concerns at the authorized concentrations.

[96] In his evidence, Mr. Robb also explained that Metro Vancouver created a staff "task force" to manage the Permit, and hired an additional staff resource to help deal with odour complaints alleging Harvest as the source.

[97] Mr. Robb states that he did not consider removing the Facility from the area, nor a near complete suspension of Harvest's activities, to be advisable for the protection of the environment. He considered it reasonable to issue a short-term permit (rather than the 10-year term for which Harvest applied) premised on the expectation that Harvest would do what was necessary to address and mitigate the anticipated odour issues, while enabling it to continue operations. Further, he testified that there are specialists on his staff whose primary role is to troubleshoot air quality problems. Mr. Robb believed that the terms and conditions he included in the Permit would be protective of the environment and, in particular, manage odorous air contaminants. He also considered it reasonable, in the circumstances, to give Harvest an opportunity to make the required changes to operate the Facility at its current location. Mr. Robb believed that it was not advisable to shut down the Facility when upgrades and Permit terms could adequately protect the environment.

[98] In Mr. Robb's view, the works and measures incorporated into the Permit, including the Sniff Test, are adequate and effective and, if complied with, would result in a reduction of odorous emissions from the Facility and protect the environment.

[99] The question for the Panel is, did the Permit meet these objectives?

b) What is the evidence regarding characterization of the odour attributed to Harvest, and how far away from the Facility (and how often) it was detected.

The Group Appellants' evidence and submissions

[100] Almost all of the Group Appellants, and their witnesses, asserted that odours from the Facility had become more frequent and less tolerable over the 4 years preceding September 30, 2016, the date the Permit was issued, and for a period of time thereafter. However, those who testified (and the witnesses they called) said

that odours attributed to the Facility have been less noticeable – having decreased in frequency, at least – over a period of more than a year preceding the hearing, except for a number of noteworthy occasions.

[101] The Group Appellants further submit that the Permit terms – including those of the Amended Permit – do not adequately protect their health and the environment and prevent pollution. They submit that the contaminants from the Facility are experienced as offensive odours both within and beyond the Table 1 parameters, and have negatively affected the air and their quality of life and resulted in adverse health impacts and pollution. They are adamant that the odours emanate from the Facility.

[102] The evidence of the Group Appellants who testified at the hearing, and their witnesses, is summarized below.

Arnold E. Shuchat (Appeal No. 2016-EMA-173)

[103] Mr. Shuchat lives approximately 8 kilometres west of the Facility. He initially thought that Harvest was a garbage receiving station. Prior to filing his Notice of Appeal, he drove to the site and confirmed that the odours he experienced were coming from the Facility.

[104] Mr. Shuchat testified that, at times, the smell makes him nauseous, gives him headaches, and bothers him so much that he does not walk his dog as much as he normally would. He normally leads an active lifestyle and likes to be outdoors, but has taken to exercising inside. Mr. Shuchat testified that the smell "seems to move around" and would not necessarily "be there" if an enforcement official came to investigate a complaint.

[105] Mr. Shuchat works as a realtor. He believes that the odour from the Facility adversely affects Richmond's reputation as a desirable place to live, and has a negative impact on real estate values. He does not believe that he benefits from what Harvest does.

[106] Mr. Shuchat acknowledged that the odours "peaked" in 2016, have recently been more sporadic and less pervasive, and that he likely would not have appealed if "the current conditions" had existed in 2016.

[107] Mr. Shuchat testified that he has not complained about the odour from the Facility every time that he could have, and isn't sure that complaining does any good. He became a spokesman of sorts for residents concerned with the odour from Harvest's Facility, and started a Facebook page about the issue.

[108] Mr. Shuchat expressed concern that the Permit allows Harvest to circumvent section 2 of the *Act* by causing air pollution that affects communities other than just Richmond, and leads to stress and illness. He believes that Harvest's operations should be performed in a sealed facility that does not emit odours and other contaminants capable of causing discomfort to any person, and consistent with the *Act's* objective of not adversely affecting the health or safety of any person or life form or the environment. In his Notice of Appeal, Mr. Shuchat asked for more fulsome enforcement, but would prefer to see the Permit revised or abridged.

[109] Mr. Shuchat called 5 witnesses to testify at the hearing. Their evidence is set out below.

i) Crystal McGowan

[110] Ms. McGowan has lived in Richmond for 25 years, and currently lives in a neighbourhood approximately 4 kilometres northeast of the Facility. She has a long history of respiratory health issues, many of which are triggered by a heightened sensitivity to odours, symptoms that got significantly worse in 2016. In 2016, her symptoms were diagnosed as "central sensitization disorder". Amongst other things, she experiences a variety of symptoms that affect her health such as shortness of breath, headaches, voice loss, and nausea.

[111] Although she recognizes that her intolerance is worse than most others would experience – it is medically dangerous for her – she said that the unpleasant odour that she associates with Harvest's operation also affects her family and social life: under the odorous conditions they cannot use their backyard, and it can be too unpleasant to have company visit their home.

[112] Ms. McGowan works about half a kilometre from the Facility, and found the malodour was worse, and affected her even more, at work. She carries and uses a mask in order to be able to breathe, and has left work because the odour made her ill.

[113] Ms. McGowan testified that the odours from Harvest became a "trigger" for her symptoms. She did not complain every time she experienced the odours, but could have complained hundreds of times.

[114] Ms. McGowan recently went on permanent disability because of her respiratory health issues. She finds that her symptoms largely resolve when she visits places that have fresh air.

[115] Under cross-examination, Ms. McGowan acknowledged that she experiences respiratory problems from organic materials associated with or used on farms, but distinguished those odours as being different from the rancid "rotten cabbage smell" that she associates with the Harvest odour. She noticed a distinct change in odour during the spring of 2017 and early summer of 2018 (which may have coincided with the Energy Garden and one of the CASPs being taken out of operation). Ms. McGowan admits that she has not visited the Facility, nor is she familiar with other potential sources of odours – although she smells the same odour, and experiences the same reaction, when she drives past the Enviro-Smart site in Delta. (The Panel takes notice that she and other witnesses referred to Enviro-Smart Organics Ltd. ("Enviro-Smart"), a composting facility located in Delta, BC., a relatively short drive south-east of Richmond). Ms. McGowan agreed that there were some months when there was no smell, or it was less noticeable.

ii) Melody Davies

[116] Ms. Davies is a recently retired administrative assistant in the local school district. She has lived in Richmond, approximately 5 kilometers west of the Facility, for about 20 years. She worked approximately 4.5 kilometers west of the Facility.

[117] Ms. Davies has been aware of the odours associated with Harvest's operations for years, but initially did not complain because she was not aware that there was a place to do so. She complained 28 times in 2017, but testified that she could have complained every day, including several times on some days.

[118] The odour that she detects is a distinct smell that comes and goes "in varying degrees". She has driven close to the Facility and is positive that the smell emanates from there. The smell was pervasive in the interior of the school where she worked, and was a common topic of conversation amongst staff. People have asked her, "How can you stand it?"

[119] Normally healthy and not one to complain, Ms. Davies believes that the odours have caused her to experience nausea, watery eyes, a sore throat, sore muscles, and have made her emotional. She has also experienced sleep deprivation, awakening in the middle of the night from dreaming about "a horrible stench". Ms. Davies has stayed home from work a number of times because the odours made her feel sick. In an effort to minimize the odours that permeate into her home, she bought an air purifier.

[120] Although Ms. Davies supports the idea of composting and is normally a positive person, she feels helpless and hateful towards the people who are responsible for the Facility and the odours it creates. Ms. Davies explains that the odours are not merely an annoyance: they have greatly interfered with her life and she wants them to stop.

[121] In cross-examination, Ms. Davies agreed that she is not able to say whether at least some of the odour she's attributed to Harvest originates from the Enviro-Smart facility. She agrees that the odour is "not as bad" now as in the past, but states that it is still strong and pervasive, describing a "terrible smell" the week prior to her testimony.

iii) Bhupinder Dhiman

[122] Mr. Dhiman is a blueberry farmer and longshoreman who lives with his family about 3 kilometres southwest of the Facility.

[123] Mr. Dhiman first noticed the odour that he associates with Harvest – an acrid, offensive smell – in or around 2012. He states that, as a farmer, he is aware of the odours of the various types of compost applied in the area and can distinguish those odours. Mr. Dhiman testified that the odour that he associates with Harvest is different from the odours that he associates with farms, and that the Harvest odour was frequent, but not daily. In 2014 he confirmed for himself that the odour emanated from the Facility. Further, he has been to the Facility more recently, and has confirmed that it is where the smell is coming from.

[124] In terms of impacts from the odour, Mr. Dhiman testified that the odour makes it hard or unpleasant to breathe, and he attributes the odour to causing watery eyes and irritability. He testified that there have been days when the odour is so overpowering that neither he, nor others, could work outdoors, and that there have been occasions when the seasonal farm workers said that they did not come

to work because of it. In addition, Mr. Dhiman testified that his mother, who lives at his home, often cannot go outside because of the smell.

[125] Mr. Dhiman also told the Panel that he walked around his farm with his young niece on a fall day 3 years ago when the odour was "9 out of 10", and was pervasive "6 days a week". Once he learned to direct his complaints to Metro Vancouver, he reported the smell 4 or 5 times per week between 2014 and 2017. Mr. Dhiman said that the smell has subsided more recently (it is less frequent and not as intense as it used to be), but it is "still there", and is most noticeable in the mornings and evenings.

[126] Under cross-examination, Mr. Dhiman stated that he usually smells Harvest's odour when the wind is blowing from the east, or when the air is stagnant.

iv) Nancy Smith

[127] Ms. Smith is a retired oncology nurse. For 25 years she has lived in her residence, just over 10 kilometres west of the Facility.

[128] Ms. Smith smelled the odour that she attributes to Harvest's operation a couple of years before it became noticeably more intense in 2016. She has been to the Facility and determined that it was the source of the "disgusting" odour. She describes the particular odour as being like "rotting garbage" and "acidic … like baby diarrhea but worse". The odour has caused her eyes to water and burn, burned the inside of her nostrils, and has made her cough and feel like throwing up. She testified that the odour has woken her from sleep, even when her windows were closed, and has impacted her participation in outdoor activities. Ms. Smith has felt imprisoned in her own home, and is concerned about the impact of the odour on her health and the health of others in the community. The pervasive odour makes her feel embarrassed to live in Richmond, and makes her want to move away.

[129] Under cross-examination, Ms. Smith said that she was not familiar with the Ecowaste Industries Ltd. site ("Ecowaste"), which is more-or-less adjacent to and west of the Facility; however, she had no doubt as to where the odour of concern originated. She testified that the odour of concern to her is distinctive, and is the "exact same" odour that she smelled at the Harvest site.

[130] Ms. Smith agreed that the odour seems to have been less intense lately, but states that she still doesn't feel comfortable doing outdoor activities because of the odour.

[131] Ms. Smith said that she is aware of the Enviro-Smart facility, but the smell that she associates with Enviro-Smart "goes away" before she enters Richmond.

v) Tom Hopper

[132] Mr. Hopper has lived for 43 years at the same address in the most westerly part of Richmond, more than 10 kilometres west of the Facility.

[133] Mr. Hopper recalls first smelling the odour that he associates with Harvest's operations in 2013 or 2014, later learning from a newspaper article in 2016 that it

emanated from the Facility. He drove there and verified, for himself, that the Facility was the source of the odour. Mr. Hopper has made more than 20 complaints about the odour, although he also states that this number is about one-tenth of the times that he could have done so.

[134] Mr. Hopper attended the public meeting at which a Harvest representative admitted that Harvest was the source of the smells and apologized for inconveniencing local residents. Mr. Hopper characterized the sweet-sour, rotten, garbagy, almost sewery stink as being so overpowering at times that he cannot go outside. The odour is sometimes fleeting and other times lingers. It is a topic of conversation in his neighbourhood: amongst other things, someone a short distance down his street might complain, whereas it would not be noticeable at his home. On many occasions - and as recently as August 29, 2018 - he and his wife, who enjoy socializing outdoors, have had to move inside because of the odour.

[135] Mr. Hopper recently smelled a similar odour in Delta, south of Richmond. Under cross-examination, he agreed that the odour from Harvest could be confused with a sewage smell, but clarified that the Harvest odour is distinctly different from those he associates with a sewage treatment plant and the other wastewater treatment operations that are relatively close to his home. He said that the odour occasionally awakens his wife during the night, and has made her feel unwell while at work to the point of causing her to vomit.

Siamak Zand (Appeal No. 2016-EMA-156)

[136] Mr. Zand is an electrical engineer who lives 0.7 kilometres northwest of the Facility with his wife (also an engineer) and their children. Mr. Zand testified himself, and called two other local residents as witnesses. He states that the odour is worse when they are downwind from the Facility. He states that the smell has permeated their home, even though they typically keep their doors and windows shut, and that the smell “remains with him” when he is not at home. Mr. Zand testified that the odour emissions from Harvest affect his family’s lifestyle: they cannot use their yard much of the time, and the children have to come inside because of the smell. He said that they do not invite guests to their home because of the pervasive stench, and people have asked him why they live there.

[137] Although worse in the fall of 2016 than it has been more recently, Mr. Zand states that there are times when he has to plug his nose just to walk between his house and the car. He would not have purchased his home if he had been aware of the odour. He says the odour is also noticeable at his workplace and has pervaded the school that his children attend, both several kilometres away.

[138] Mr. Zand is concerned about adverse health effects from the air contaminants emitted from Harvest’s operations, ranging from eye irritation, headaches, nausea and throat irritation, to chronic health effects. He is also concerned that the air contaminants may cause cancer. He is concerned that the odour impacts his children’s appetites and may have adversely affected their health and that of others at their school.

[139] Mr. Zand testified that Metro Vancouver does not follow-up on complaints in a meaningful way. For example, no Metro Vancouver representative has ever come

to his home in response to the many complaints that he and his wife have made. He has personally telephoned Metro Vancouver to complain less than 10 times, but "could have complained 500 times". It upsets him that the District Director authorized increased emissions when the Permit was issued, and extended the Table 1 radius for monitoring odorous emissions to several kilometres from the Facility. He believes that the odours and volatile organic compound contaminants are significantly greater in the area near his home.

[140] When cross-examined, Mr. Zand agreed that the odour was worse in 2016 and 2017, and that he had noticed improvement in the odour earlier in the summer of 2018. However, he also stated that the odour had worsened in recent weeks. Mr. Zand acknowledged that many offensive odours are detectable in his neighbourhood, but clarified that the odour from the Facility is distinct and regular. He is concerned that his home has lost value because of Harvest.

[141] Mr. Zand expressed dissatisfaction with the District Director's efforts to enforce the Permit, and is frustrated that the District Director does not seem to interpret the legislated definition of "pollution" in favour of local residents. He was told that his remedy was to appeal the Permit. Mr. Zand states that he would not be satisfied if the Sniff Test perimeter was at his home.

[142] When asked by the Panel what he would like to see happen, Mr. Zand said he would like to be able to trust government regulatory agencies to do their job, and wants to live in a healthy, accessible environment without being concerned "that the smell will come". His goal is to see "a proper permit" with no odours or other air contaminants authorized beyond the Facility, and proper enforcement, including shutting the Facility down if there is an issue.

[143] He wants the Permit cancelled, and for contaminant emission levels to be returned to the previous Permit limits. He also says the Facility should be relocated.

[144] Mr. Zand called two witnesses to give evidence at the hearing. Their evidence is as follows.

i) Sulkanna Jaffer

[145] Ms. Jaffer, a long-time Richmond resident, has been vice-principal of the school that Mr. Zand's children attend since 2005. Ms. Jaffer testified that the school has about 150 students and 20 staff, and is approximately 4 kilometres west of the Facility. She testified that the foul odour "started to come and go" in 2012 or 2013, and became more irritating and pervasive in 2016. It has not been as strong in the past several months, but "seems to last longer". Ms. Jaffer attributes increased student absenteeism to the odour, and believes that it makes students lose their appetites, vomit, and that students sometimes don't like to go outdoors. The odours have also permeated inside the school. An inspection of the school's water and air circulation systems confirmed that those utilities are not contributing to the problem.

[146] Ms. Jaffer meets five times a year with officials from nearby schools and they have similar complaints. She has never gone to the Facility, but knows that the

odour comes from somewhere east of her school and that it is the same odour that others complain of.

ii) Hanieh Alavi

[147] Hanieh Alavi is married to Mr. Zand. She complained to Metro Vancouver about the Harvest odour almost daily for a period of time beginning in the fall of 2016, but tired of doing so because nothing was ever done. It made her emotionally upset. She describes the distinctive smell as "sour food garbage-like".

[148] In cross-examination, Ms. Alavi agreed that the odours have "improved" over the past year and a half but said that the odour had worsened in the past couple of months, during which there were many times when she and her family didn't go outside and had to keep their doors and windows closed.

[149] Ms. Alavi is aware that some parts of Harvest's operations have been shut down. She follows the Facebook page created by Mr. Shuchat, and observed from posts that sometimes the smell was bad for them but not for others, and vice-versa. She is not aware of any investigation being undertaken because of her complaints to Metro Vancouver. She is certain that the odour she smells is the same one that her husband has identified as emanating from the Facility. That odour is "always the same".

Isabelle & Marc Brenzinger (Appeal No. 2016-EMA-155)

[150] Isabelle Brenzinger attended each day of the hearing. Her testimony reiterated much of what is contained in the Statement of Points that was filed in support of the Brenzingers' Notice of Appeal (and which was marked as an Exhibit in the hearing).

[151] The Brenzingers' home is approximately 1 kilometre north of the Facility, within the Agricultural Land Reserve. Ms. Brenzinger testified that, amongst other things, she noted that the odours from the Facility became unbearable after Harvest took over the composting operation, stating: "It was like someone turned on a switch." Prior to that, she did not find the composting odour offensive. She described the odour as "unprecedented" and distinctly different from what she associates with farm smells.

[152] Ms. Brenzinger explained that the odour got decidedly worse after Harvest started receiving food waste. Since November 2015, she has noticed the odour "most days". She and her husband appealed because it troubled them that the Permit authorized more air contaminants than the previous Permit, despite what she perceived as Harvest's poor record of compliance.

[153] According to Ms. Brenzinger, the odour was at its worst in the fall of 2016. She described it as being "thick" on October 15, 2016 and November 11, 2016. At that time, the odour was so bad that she felt she could not get enough air.

[154] Ms. Brenzinger initially complained about the sour odour to various government offices in the fall of 2016, including Metro Vancouver. The federal environmental ministry recommended that she direct her complaints to a provincial

government agency, the regional district, or Harvest. She called a provincial emergency management office several times, but nothing was done; she was eventually told not to call them anymore. Ms. Brenzinger also wrote to Richmond and Metro Vancouver without apparent effect. At some point, she signed a neighbourhood petition complaining about the odour. Ms. Brenzinger testified that she became frustrated that nobody seemed to be able to help, and that her complaints did not seem to make a difference.

[155] Ms. Brenzinger described the odour as “unprecedented”, “sour”, “putrid”, and sometimes “chemical”. She states that it “comes and goes” and can be “in pockets” (that is, she sometimes barely notices it only a few feet from where it is overpowering). In terms of impact on her life, Ms. Brenzinger testified that she used to walk near her home, but stopped doing so because she got watery eyes and nausea that she believes was caused by air contaminants. She states that it sometimes felt like she had a “film” over her eyes. The symptoms would improve, however, when she was no longer in the vicinity of her home.

[156] Ms. Brenzinger says that the symptoms are not limited to her family: their neighbour’s children also complained of headaches and burning eyes. She further noted that her nephew’s high school class collectively wrote letters to Metro Vancouver complaining about the odour.

[157] Ms. Brenzinger said that her home is at a lower elevation than the Facility (1 meter above sea level versus 11 meters above sea level), and asserts that the emissions – which she understands from her research may be heavier than air – do not always disperse with the wind; rather, they tend to pool in the vicinity of their neighbourhood. This is particularly a problem when temperature inversions occur and there is little wind.

[158] Under cross-examination, Ms. Brenzinger agreed that the pervasive odour has subsided in the past year, or at least in recent months; however, she specifically recalled it being particularly severe on September 2, 2018, when it caused her eyes to burn. Although the odour that she associates with Harvest is not constant, she still does not enjoy being outside at her home. She was unaware of any smells that might emanate from a nearby business known as Ecowaste. In her view, it is unfair that, although the odour theoretically disperses as one gets further from the Facility, it is generally prevalent where they live, and yet the radius for the Sniff Test is generally well beyond their neighbourhood.

[159] In response to questions by the Panel, Ms. Brenzinger said that she recognizes the benefit of having a composting facility, but is frustrated because it has “taken too long to fix the problem”. In her view, the failure to address her complaints is unfair to the residents who have a right to breathe fresh air and enjoy the outdoor environment. She thinks that Harvest should be required to comply with applicable laws designed to protect the environment, and would like to see their air quality returned to what it was “when it [Harvest] was just a landscaping facility”. Ms. Brenzinger wants “to see the light at the end of the tunnel” sooner rather than later.

[160] During her testimony, Ms. Brenzinger sought clarification from, and was assured by, the District Director that Harvest would not receive more food waste

after April 1, 2019, and that a new permit, or at least a permit amendment process requiring public consultation, is required before the anaerobic digestion portion of the Facility (the Energy Garden) could be restarted.

[161] The Brenzingers ask the Panel to rescind the Permit and to require that the anaerobic digesting operations be moved elsewhere. They submit that an alternative remedy would be to install contaminant emission monitors, and to have the Facility revert to only composting yard and landscaping waste.

Maria Reeve (Appeal No. 2016-EMA-164)

[162] Ms. Reeve attended the hearing in its entirety. She made submissions but did not testify. She relies on the contents of her Notice of Appeal.

[163] In her Notice of Appeal, Ms. Reeve asserts that the odour from the Facility affects her quality of life and her health (and that of her family). She described the odour as "unbearable", and is troubled that people in Richmond are forced to breathe air contaminants that could contain toxins that impact their health, both short-term and long-term. Ms. Reeve lives approximately 12 kilometres west of the Facility.

Group Appellants that did not attend the hearing

[164] As noted earlier in this Decision, only 4 of the Group Appellants attended some or all of the hearing. However, in a pre-hearing teleconference the Panel Chair agreed to consider the concerns of all of the individuals who filed Notices of Appeal, notwithstanding that they did not attend the hearing or offer testimony. The following is a précis of the concerns by the Group Appellants who did not attend the hearing, taken from their Notices of Appeal.

[165] The Panel notes that the Notices of Appeal were all filed prior to October 30, 2016, reflecting their concerns at that point in time. It became apparent during the hearing that odours in the community have improved since then, but not to the point that these Group Appellants were willing to withdraw their appeals. Their concerns are summarized as follows:

- Don Tegart (Appeal No. 2016-EMA-154) states that he has lived in the area for 60 years, during which he does not recall any offensive odours other than farm smells. He states that farm smells are not as offensive as those that he attributes to Harvest's operations. In the four years preceding October 2016, he states that the odours became worse and more frequent. The odour affects his enjoyment of his home – particularly outdoors – and he finds it embarrassing when friends visit him.
- Robert and Susan Enslen (Appeal No. 2016-EMA-157) assert that nobody should have to breathe the foul odours caused by Harvest's composting operation. They state that when the odour is noticeable, their 2 children complain of shortness of breath, watery eyes, and headaches. The Enslens state that the odour got worse in the months preceding October 2016.

- William Evans (Appeal No. 2016-EMA-158) describes the air quality as "unhealthy, vile & disgusting". He says that he has developed a persistent cough and respiratory problems, which he attributes to air contaminants from the Facility. Mr. Evans and his wife have lived in the area, relatively near the Facility, for more than 30 years. His respiratory health improved, although his persistent cough remained, after they tried moving to California.
- Joel Shaikin (Appeal No. 2016-EMA-159) states that the foul smell makes it difficult to sleep, and has devalued his property. He believes that his children have developed coughs (some worse than others) because of the air contaminants.
- Brian Milne (Appeal No. 2016-EMA-160) states that the air pollution makes it difficult for him to enjoy living in Richmond. In his view, people living in Richmond should not be exposed to the odorous air pollution and associated potential health concerns from the Facility.
- Christiana Shum (Appeal No. 2016-EMA-161) is troubled that the Permit authorizes a five-fold increase in air emissions. She has pre-existing asthma. She is concerned about the odours, but also that some volatile organic compounds are toxic and harmful to human health. Further, Ms. Shum is concerned that birds and insects might be attracted to the site and then go elsewhere – a possible risk to the greater environment.
- Edward Bruce (Appeal No. 2016-EMA-162) is concerned that there have not been adequate health impact assessments done regarding air emissions from the Facility, let alone at the levels currently authorized. He asserts that the foul odours indicate that the emissions exceed what is permitted, and that the regulator is not appropriately monitoring emissions to enforce the Permit. Mr. Bruce acknowledges that composting is an inherent part of recycling, but suggests that there are technological improvements available that are not being used.
- Devra Fay Samson (Appeal No. 2016-EMA-167) states that the Permit has profoundly impacted the air quality in her neighbourhood. She cannot enjoy being in her yard, let alone open windows due to the inescapable, nauseating "stench" from the Facility.
- Jennifer Taylor (Appeal No. 2016-EMA-168) has been a Richmond resident for more than 30 years. She states that the odour is constant and offensive, day and night. She describes it as a "foul stench" and says that she wakes up smelling the odour in her home when windows are open. She is concerned about the increased emissions authorized by the Permit, and that the emissions are considered by Vancouver Coastal Health to be a "cause for concern". She is concerned for the health and safety of her family, and that the odours will impact property values.
- Trevor Tso (Appeal No. 2016-EMA-170) states that the foul odour can be smelled day and night, and beyond a 5 kilometre radius of the Facility. He suggests that it causes headaches, nausea, respiratory problems, and is concerned that it could cause cancer.

- Lai Y.T. Lam (Appeal No. 2016-EMA-171) states that the District Director did not adequately consider the concerns and well-being of Richmond residents when he granted the Permit. He is concerned that the Permit increases the permissible air contaminants by 7-fold, doubling the amount of sulphur oxides and allowing hydrogen sulphide and ammonia emissions, and that it allows a 10-fold increase in volatile organic compounds. Mr. Lam maintains that the unpleasant odour from Harvest adversely impacts his life, such as not being able to garden or enjoy other outdoor activities. He is also concerned about potential adverse health effects.

  In a fulsome addendum to this Notice of Appeal Mr. Lam asks the Panel to order the following changes to the Permit:

  - it should expire in September 2018 rather than 2020;
  - there should be reduced (and measurable) limits on emissions similar to those in the previous Permit, while maintaining the "harm reduction requirements" specified in the Permit;
  - the maximum number of permissible malodour days should be reduced to one in a 14-day period for 2018 and zero by 2020; and
  - reporting should be quarterly rather than annually, with stricter and more regular enforcement of air quality including punitive measures for violations.

- Yuun Lam (Appeal No. 2016-EMA-172) states that odours from the Facility impacts quality of life, devalues property, and discourages local investment. He believes that people feel sick as a result of breathing in foul-smelling air, which leads to increased healthcare costs, and that the enforcement provisions in the Permit are inadequate.

- Maria Carmen Alfaro and Carlos Alfaro (Appeal No. 2016-EMA-174) state that the air pollution keeps them awake at night, they cannot open windows or use their air conditioner or furnace, and are not able to enjoy the outdoors – even to go for walks. They suggest that the emissions are particularly aggravating to the health of children and the elderly, noting that the area has a large, dense population.

  They state that the air contaminants from the Facility can equally impact breathing at 3 kilometres as it does further away, with equal strength of odour; therefore, Table 1 is inherently flawed. They allege that the air contaminants released by Harvest contain a "mix of dangerous volatile organic compounds (VOCs) and other chemical substances that form a heavy cloud of contamination that can travel farther than 15 km in any direction, without dissipating."

  The Alfaros also state that the air emissions are dispersed in an unpredictable pattern, forming "clouds of pestilence sometimes as narrow as a few metres wide traveling at different levels of altitudes, depending on air temperature, wind, and other factors." They note that at the same time that the strong odour from the Facility is keeping residents locked

up in their homes in Steveston, there may be no odour detected at close proximity to the Facility – further putting into doubt the validity of Table 1.

- Christie Michel (Appeal No. 2016-EMA-176) has lived in Richmond for more than 50 years. She states that her asthma has worsened in conjunction with the emissions from the Facility. It frustrates her because she cannot enjoy outdoor activities, let alone open the windows in her home, due to the odour from Harvest's operation. She lives more than 8 kilometres away from the Facility but complains routinely about the air quality, and has installed an air filter in her home.
- Alexandra Neufeld (Appeal No. 2016-EMA-178) describes the odour from Harvest as being pervasive, more than a nuisance. For example, even the inside of the house "reeks", she gets headaches if outside her home for longer than 10 minutes even if the odours are relatively mild, and needs to drive elsewhere to walk the dog.

Richmond's evidence and submissions

[166] The Panel views Richmond's position as more aligned with the Group Appellants' on this issue. As such, Richmond's evidence and submissions are set out ahead of Harvest's and the District Director's.

[167] Richmond submits that the Facility has – both before and after the appeals were filed – emitted significant widespread airborne substances that produce noxious odours. Those emissions have a significant impact on the well-being and comfort of residents, and on the livability of the community. Richmond submits that the air emissions have a tangible detrimental impact on individuals. As such, the noxious odours are a form of "pollution", as defined, and need to be regulated.

[168] Richmond submits that stakeholder consultation on the previous Permit and approvals were predicated on the idea that Harvest would invest capital and improve its Facility over time. It states that short-term concessions were sought by Harvest to allow this, with the overall goal of reducing and improving emissions. Richmond submits, however, that the scale and extent of noxious odours emitted from the Facility have far exceeded anything described, proposed, or advanced by Harvest during consultations.

[169] Richmond presented both factual and expert testimony relating to the presence and severity of odours emitted from the Facility. It retained Dillon Consulting, an environmental engineering firm, to do an odour monitoring study in relation to air contaminants from the Facility. The findings are set out in a report titled "Community Odour Monitoring– Summary Report", dated February 2018 (the "Dillon Report"). Richmond submits that this report, and the testimony of 4 witnesses from Dillon Consulting (summarized below) establishes that the odours generated by Harvest are distinct, identifiable, and consistently range from simply unpleasant to an intensity that substantially interferes with the well-being of persons in the vicinity of the Facility.

Fraser Mah

[170] Fraser Mah has a master's degree in engineering and is working towards becoming a professional engineer. He is one of 3 assessors who collected field data for the Richmond odour monitoring study. The other 2 assessors were Klaryssa Lawrie and Carrie Kwok. Mr. Mah also assisted in preparing the Dillon Report in which the field data were presented.

[171] Mr. Mah testified about the methodology used to monitor odours upwind and downwind of the Facility during 25 sampling periods between February 24 and May 19, 2017, and 5 times between November 16 and December 1, 2017. He explained how each of the 3 samplers assigned to this project was trained to recognize and report the detection of odours, wind direction, and intensity of odours at locations in the surrounding neighbourhood, both upwind and downwind of the Facility, that had been pre-selected to also consider other potential odour sources. The sampling points were outdoors and publicly accessible. The samplers worked in pairs, and filled out forms independently of each other. They used an "odour wheel" to characterize and assess what they smelled. The specified sampling locations ranged from 3.5 to 5 kilometres downwind to 1.5 to 3 kilometres downwind. Upwind locations (1.5 to 2.5 kilometres) were also sampled.

[172] According to Mr. Mah, the samplers were asked to record the average intensity of any odours they noted on a scale of 1-10, and the offensiveness of the odour. Offensiveness was identified as:

T/N – Tolerable/Neutral

U – Unpleasant

VU – Very Unpleasant

TO - Terrible/Offensive

HO – Highly Offensive/Unbearable

[173] Mr. Mah said that the study team tried to be aware of all potential sources of odour in the vicinity during their fieldwork, with a view to eliminating bias. Mr. Mah stated that he and the other assessors did not always attribute the source of odour to the Facility.

[174] On March 17, 2017, Mr. Mah and another assessor also visited the Ecowaste facility, located adjacent to the Facility, in order to assess odours and identify waste management activities conducted at that location. Mr. Mah testified that he was able to distinguish the odours coming from the Facility from those that might be from other sources, such as manure spreading or Ecowaste. Mr. Mah stated that, on at least one occasion, he detected odours from the Facility that were both intense (an intensity score of 7) and "offensive" under the sampling protocols used for the study.

Klaryssa Lawrie

[175] Ms. Lawrie received training consistent with the odour monitoring methodology explained by Mr. Mah. She participated in field sampling on 22 occasions.

[176] Ms. Lawrie described the Facility's odours as being very distinctive and generally consistent with odours of rotting and decaying food. She had smelled the odour in the community independently of the study, including once when she felt it was particularly offensive. Ms. Lawrie has worked at waste management sites, including the Facility, and stated that she has also been at the Harvest site doing a waste separation project during the fall of 2017. She said that the odour at the Facility at that time was consistent – in terms of being recognizable – with what she detected when collecting data as an assessor during the odour monitoring study.

Carrie Kwok

[177] Ms. Kwok also participated in the odour assessment training and odour monitoring study. She has a biology degree and is working towards her professional biologist certification. Ms. Kwok had no prior training or field experience in this type of project. She was able to distinguish the Facility's odours from other noticeable odours in the area by having gone to the Harvest site on each of the 7 days that she did sampling, and other comparisons made in the field.

[178] Ms. Kwok said that the Harvest odours ranged from "tolerable" to "highly offensive" - meaning easily detectable to being "pretty overpowering" (the latter meaning that she would not want to reside or be in the vicinity for very long to not wanting to stay there for more than a minute or two).

[179] During the study, Ms. Kwok detected the stronger odours approximately 1 kilometre north of the Facility. Ms. Kwok does not have any particular sensitivity to unpleasant smells, and is aware that even pleasant smells can become intolerable.

[180] Ms. Kwok also participated in the visit to Ecowaste. She testified that the discernible odours from the Ecowaste operation were distinctly different, more soil-like, than the pungent sour smell from the Facility.

David Diemer

[181] Mr. Diemer, P.Eng., a senior environmental engineer with Dillon Consulting, was qualified to testify as a professional environmental engineer with expertise in odour assessment and experience doing air quality assessments, including projects in which he assessed the odours in a community using meteorological observations by human assessors.

[182] Mr. Diemer was the Project Manager for the odour monitoring study, and developed the protocols to assess odours in Richmond. He was familiar with the Harvest operation, and said that the Harvest odours are distinct and recognizable. In Mr. Diemer's opinion, the array of observation points in the study adequately sampled the odours possibly emanating from the Facility. He trained the assessors to make subjective observations of odours using an "odour wheel."

[183] Mr. Diemer wrote the Dillon Report, which analyzes and summarizes the results of the odour monitoring study. Based on the results of the odour assessments of the 3 samplers, he concluded that odours ranging from 1 to 6 in intensity - and offensiveness from "tolerable" to "terrible/offensive" - were discernable at the most distant downwind sampling locations during the sampling periods (5 kilometres). At the closest sampling locations (1.5 kilometres), intensities ranged from 1 to 10 (with 10 being the highest) and offensiveness ranged from "tolerable" to "highly offensive".

[184] Mr. Diemer also concluded that, although Ecowaste might contribute to odours in the area, the odour from the Facility was distinctly recognizable, and that Harvest was more likely the greater contributor of odours in the vicinity of the study.

Harvest's evidence and submissions

[185] Harvest submitted that the Group Appellants did not provide any expert evidence linking the Facility's air emissions with the adverse effects that they claim to have experienced.

[186] Harvest further submits that its experts are of the opinion that: (1) many of the observations made by Dillon Consulting are inconsistent with the Facility being the source of the odours; (2) that its odours are not consistent, recognizable or unique, and therefore are not capable of being consistently identified in the community; and (3) that the connection between emissions from the Facility and the adverse health impacts reported by the Group Appellants, and their witnesses, is flawed. Regarding the latter, it argues that there is no direct medical evidence linking the actual emissions from Harvest (whether primary or otherwise) to the reported symptoms of the Group Appellants (see *Louisiana Pacific Canada Ltd. & Peace Country Environmental Protection Association v. Deputy* Director of Waste Management, (Appeal No. 96/30 – WASTE, December 23, 1997; *Fleischer et al. v. Assistant Regional Waste Manager*, (Appeal No. 98-WAS-29(d), January 12, 2000). Harvest further submits that the "offensiveness" and frequency of odours alleged to have been emitted in 2016 are no longer present.

[187] For these reasons, Harvest submits that the Group Appellants have not established, on a balance of probabilities, that the permitted emissions are responsible for the health effects reported, cause pollution, or that the odours described are caused by the Facility.

[188] In support of its position, Harvest called evidence from 4 witnesses, including 3 who gave expert testimony that dealt with the attribution of odours to the Facility, considerations about olfactory science and public health, and modelling dispersal of air contaminants to illustrate the relative severity of odours emitted from the Facility.

Gary Aguinaga

[189] Mr. Aguinaga is a vice-president of Harvest's parent company in charge of organics for western North America. He is Harvest's chief operating officer in Richmond. He chronicled changes at the Facility since being hired in May 2016.

[190] Mr. Aguinaga made his first visit to the Facility with Vancouver-area staff in the early Fall of 2016. In mid-November 2016, Mr. Aguinaga was made responsible for addressing the odour issues that had been identified at Harvest. In an effort to be a "good neighbour" and an integral part of the community, he attended public meetings and met with key stakeholders and elected representatives in regards to Harvest's operations.

[191] According to Mr. Aguinaga, the Anaerobic Digester and power generation ceased operation in October/November 2016 in an effort to isolate and identify the source of odours at Harvest during this period. Harvest also made operational changes, including creation of an Odour Action Team that met twice daily, adherence to a system of written reports, on-site inspections, feedback reports aimed at better controlling operations, as well as staff changes. Several modifications were also made to the CASPs in terms of controlling moisture, temperature, pH, and oxygen content of the piles, and the introduction of shredding equipment with greater capacity to process incoming waste materials. Two Odotech odour detection devices were also installed on site (although Mr. Aguinaga could not specify where they were located). He said that 3 technicians manage and sample the materials that are tipped at the Facility and at various points during processing. Harvest also does weekly on-site inspections.

[192] Mr. Aguinaga also testified that Harvest reduced the intake of commingled waste (yard and kitchen waste) from approximately 240,000 to 120-140,000 tonnes per year, and lowered the height of the CASPs from 6 metres to 3 metres in an effort to improve aeration and reduce odours. Harvest also retained a scientist from the University of British Columbia to develop and implement a climate prediction model to assess temperature, wind speed and wind direction. The goal was to make the Facility as efficient as possible without overburdening it, while forecasting the risk of odours and mitigating odours that could be correlated to public complaints.

[193] Mr. Aguinaga discussed the source of the waste intake and the composition of the finished compost, the duration of the phases involved (from waste receipt to finished compost), and the planned phasing-out of the current operations starting April 1, 2019 (after which the Facility will no longer receive food waste). He said that there are no plans for any ongoing waste management activity in the Energy Garden after that date. He also said that the "wind-down" plan for the Facility might include limited use of the Energy Garden building. He could not say what those activities might include, but they would not include the receipt of food waste.

[194] Mr. Aquinaga stated that when the remaining CASP is taken out of service as of June 1, 2019, there will be "years" worth of backlog of finished compost material left on site. He said that Harvest is having discussions with its landlord, Vancouver Fraser Port Authority, regarding early termination of the lease. He understands that the lease will not be renewed and that Harvest is required to rehabilitate the

site back to “bare land”. Harvest also has a solid waste licence that requires removal of all of the equipment, product, and waste from the site at final closure.

[195] Mr. Aguinaga gave his personal views on the odour issue. He believes that the aerobic digestion process (specifically the CASPs) were the source of the odours that triggered the many complaints in the fall of 2016, since the odours attributed to Harvest’s operation continued at some level after the tunnels and energy-generating process were shut-down. He believes that operational and technical improvements made at the Facility have resulted in fewer, although not zero, odour complaints from the community. He thought that the “signature” of the odours from Harvest would be similar to other commercial composting operations because the incoming waste streams would be the same. That said, Mr. Aguinaga noted that he had lost his sense of smell about 2 years previously, and has never smelled the odours emanating from the Facility or any surrounding operations.

[196] Mr. Aguinaga summarized what Harvest had done or planned to do to address odour concerns. He said that Harvest was sufficiently confident about improvements made at the Facility that it started accepting more food waste into the Receiving Hall during 2018. He listed a number of things that Harvest does not accept, including dead animals or slaughterhouse waste, human or animal waste, solvents, pesticides, and hazardous waste generally. He believes that new doors (that open and close faster) and a reverse air system had been installed in the Receiving Hall, although he did not have actual knowledge of this.

Larry N. Hottenstein

[197] Mr. Hottenstein holds a bachelor’s degree in chemistry and is a partner at California-based Environmental Resources Management (“ERM”). Most of his work has been directed at examining alternatives to mitigate odours. He has previously consulted on projects involving landfill and green waste composting facilities. Mr. Hottenstein clarified that he does not perform odour modelling, and is not qualified to testify about atmospheric chemistry. After some discussion regarding his limited experience with facilities that compost green waste commingled with food waste, he was qualified as an expert in odour, including odour assessment, air quality, and air pollution control. Although he never detected any intense odours in keeping with those complained of by other witnesses on the 4 days that he attended the Facility, he testified about the attribution of odours to Harvest.

[198] Mr. Hottenstein was retained by the Facility to perform several evaluations. Harvest noted that, with the acceptance of the Amended Permit, the only issues Mr. Hottenstein would address would relate to odours from the Facility as identified by citizen complaints, and the monitoring events performed by his staff, the assessors retained by Richmond, and the monitors for the District Director.

[199] Mr. Hottenstein attended the Facility on December 13 and 14, 2016, and again on May 10 and 11, 2017, at which times he conducted ambient odour monitoring in the local community. On the second visit, he provided odour monitoring training for ERM staff in Vancouver.

[200] ERM was commissioned in May 2017 to provide routine odour monitoring around the Facility and in the surrounding community. Surveys were done

approximately twice weekly from May 17 to June 29, 2017, and again on October 25, 2017. Mr. Hottenstein testified that he trained the ERM team of monitors, but did not personally participate in the monitoring program.

[201] In addition, Mr. Hottenstein reviewed Odour Survey Summary reports filed by Metro Vancouver officials from January 2017 through early June 2017, and Officer Odour Observation Protocols for Harvest for the period from February 20, 2016 to March 30, 2017. He also reviewed the dispersion modeling prepared by Chris Koscher (discussed below) to help form his opinions in this case.

[202] Although Mr. Hottenstein prepared 3 separate reports, the core of his work relates to the identification of the Facility as only one of several possible sources of area odours. His testimony appeared to be based on the information contained in all 3 reports.

[203] For purposes of the Joint Appeals (which included Harvest's own appeal), Mr. Hottenstein was asked by Harvest to respond to several questions, 2 of which were presented to this Panel for consideration and which summarize Mr. Hottenstein's primary opinions:

> Issue 1 – Are you able to discern and differentiate between odours from Harvest's Facility and odour from other sources at distances of 3, 4, or 5 kilometers from the Harvest Facility fence line?
>
> Issue 2 - What is the likelihood that the Harvest Facility is the sole source of the odour complaints that are being attributed to it by the complainants and/or by the District Director and his officers? Please explain.

[204] In brief, Mr. Hottenstein's testimony was premised on his review of the complaints and various monitoring efforts, that the Ecowaste operation (located adjacent to Facility) has potential to cause similar odours to those from Harvest, and that Harvest was not necessarily the greatest contributor to downwind odour complaints. He also testified that not all of the complaints that he reviewed could be attributed to Harvest based on his assessment of historic climate data. Also of note, he referenced odours in terms of "threshold intensity" and characterized the factors that contribute to odour complaints.

[205] Mr. Hottenstein asserted that it would be difficult to discern and differentiate odours from Harvest as compared to other "earthy" compost odours from various other sources in the Richmond area. He said that factors contributing to odour complaints include: frequency, intensity, duration, offensiveness and location (referred as the "FIDOL" factors). Further, odours can only be transported downwind, and whether an odour can be detected depends on the nature (strength, character, and relative offensiveness) of the emission. For example, odorous reduced sulphur compounds are detectable at greater distances from source than ammonia. Dispersion downwind and commingling with other odours, depending on wind direction and variability, could produce a combination of odours from different sources. He explained that odours may travel as "puffs" or pockets, and that the Harvest odours could create pockets of odours around the Richmond area. [The Panel notes that this is consistent with the anecdotal observations from the Group Appellants.] Further, the time that it takes for an odour to reach a receptor varies

based on wind speed and wind variability. For example, odours do not disperse upwind, it could take more than an hour for an odour to travel 10 kilometers, an odour could be noticeable at one place and not another and might no longer be detectable at its source.

[206] During his site visits, Mr. Hottenstein quantified the odour that he attributed to the Facility as being 2 on a scale of 10. That is, the odour was detectable and discernable, what he called "low level odour".

[207] In Mr. Hottenstein's opinion, it would be difficult to distinguish different odours and their sources at the Sniff Test perimeters in Table 1 of the Permit (3, 4, and 5 kilometers from the Facility), and it would be unreasonable to conclude that the odour at those distances would be greater than at their source. He agreed, however, that people do not typically complain about low-level odours, and reserved comment on whether people had experienced odours of great intensity and in keeping with the descriptions given.

[208] Mr. Hottenstein prepared a map illustrating the origin of complaints attributed to the Facility (from 2017 Metro Vancouver records). He acknowledged that the study by Dillon Consulting indicated that there was some odour during each sampling event, but emphasized that there are other odour sources in the area that potentially match those from Harvest's composting operations.

[209] Mr. Hottenstein agreed that odours could seep into and linger inside homes, and that the climatic condition referred to as an "inversion" could occur in the Richmond area, which could trap odours locally and could minimize dilution. However, in response to Ms. Brenzinger's evidence that her home is 10 metres lower than the Facility, he testified that a 10-metre difference in elevation should not make a difference for odour dispersion.

[210] Mr. Hottenstein acknowledged that he did not physically go on site at any other potential odour source, nor was the Energy Garden's Anaerobic Digester operating during either of his visits to the Facility. He nonetheless expressed the opinion that the Ecowaste and Enviro-Smart operations were the most comparable to Harvest's. He admitted that he had not detected any odour at either one.

[211] Mr. Hottenstein said that people could distinguish between different odours depending on the relative strengths of the odours. He noted that the odours reported by Dillon Consulting staff included descriptions of "putrid, rotting food waste, rotting garbage, fishy smell", whereas those descriptions did not appear on the sampling records prepared by ERM staff. He described the Harvest odour as a "sour compost" odour – not an "earthy" smell - but would not call it "putrid". He speculated that manure spreading was a likely source of odour based on his observations. He agreed that the Dillon Consulting study was more comprehensive than the ERM study, and that their sampling points were appropriate.

[212] Commenting on the overall frequency of complaints, Mr. Hottenstein pointed out that most people who smell a foul odour do not always register a complaint, let alone complain repetitively – and that people can get "complaint fatigue".

Dr. Pamela Dalton

[213] Dr. Dalton is an experimental psychologist at the Monell Chemical Senses Center in Philadelphia, Pennsylvania, a non-profit independent scientific institute that conducts and publishes interdisciplinary research on taste, smell, and chemesthesis. She has a degree in environmental health and a master's and PhD in experimental psychology. Her research generally relates to how people perceive and respond to odours. She has worked for industry and government, including NASA, and has testified in various courts in the United States. She has experience conducting odour monitoring studies at agriculture operations and landfills. She has limited experience with anaerobic composting operations, and does not know how similar the biosolids operations that she had previously evaluated (a feedlot and a landfill) would be to Harvest's operation. Dr. Dalton testified as an expert in olfactory science and public health, with a specialty in environmental and occupational health.

[214] Dr. Dalton was identified to the Panel as a rebuttal witness.[8] Her characterizations of odour perception in this matter are within her field of expertise, and her testimony focused on that aspect. Harvest tendered a report written by Dr. Dalton dated March 22, 2018.

[215] Dr. Dalton explained that odour detection and tolerance, and what may cause physical irritation, is idiosyncratic and subjective: it differs between individuals, similar to human sensitivity to touch and pain responses.

[216] Dr. Dalton emphasized that it would be rare for someone to experience physical discomfort from an odour unless it was a chemical irritant, and went on to say that people tend to have a psychosomatic reaction to odours: if you expect to smell something that might make you uncomfortable, then you will likely become reactive in anticipation. Dr. Dalton testified that some people are more vigilant than others in this regard, whether due to existing health issues or simply because an odour upsets them – but their reaction is independent of the actual strength of the odour.

[217] Dr. Dalton also explained that people tend to be "reactive" even when the odours are at low levels, and that they attribute the smell to the place that they have been told it comes from. Her studies take this into account when assessing how objectionable an odour really is.

[218] In response to some of the Group Appellants' evidence that the odours wake them from sleep, Dr. Dalton said that a colleague had conducted a study to determine whether odours would awaken someone. She explained that smoke from a fire would trigger a sensation for someone who is asleep, but that odour perception alone would not. She acknowledged that a smell might cause a person to awaken if an odorous gas was also an irritant, but it would be the irritant effect, not the odour, that would cause the reaction. Dr. Dalton did not know whether any of the Facility's emissions were irritants, as she did not know what gases were being emitted.

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[8] Dr. Dalton's report was in response to the February 8, 2018 expert report of Dr. Dennis Shusterman. Dr. Shusterman's report was not tendered in evidence, nor did he testify.

[219] Dr. Dalton testified that the data from the Dillon Consulting study depict odours at low levels, not at the intensity that she would consider unpleasant to the degree that they would interfere with one's ability to enjoy being outdoors. She has visited the Facility and toured the general community. She described the odours that she attributed to the Facility as being "more like a pine forest" and not offensive to her. Although some of the substances qualify as odorous at some concentration, she did not think that the air contaminants that she detected – nor based on the materials that she had been provided – were capable of injuring people. She also noted several "background odours" from other potential sources, particularly as she moved away from the Facility as a source.

[220] Many of Dr. Dalton's conclusions regarding odour detection, dispersion and dilution were based on reports by others; namely, Mr. Hottenstein, Mr. Koscher (discussed below) and Mr. Diemer. Dr. Dalton reserved comment on the anecdotal observations reported by Group Appellants – including those who testified – as to whether Harvest's odours were the cause of the symptoms reported. She was not aware of any studies regarding the effects of odours on human health and safety where people had testified under oath. However, she acknowledged that at sufficient concentration, any chemical or odour could potentially cause issues to human health or safety.

[221] Dr. Dalton stated that there is no evidence – at least none had been made available to her – to suggest that concentrations of odours from the Facility had caused, or were capable of causing, harm. Nor was she aware of any odours that would lead her to conclude that the human receptors received sufficient concentrations of chemicals to cause harm. She clarified that she would need to know the chemical composition of the emissions being complained of to reach a proper conclusion. Dr. Dalton agreed that some air contaminants from Harvest's operations could be odourless.

[222] Dr. Dalton was extensively cross-examined. She acknowledged that she is not a chemist. Further, she was not aware that the odours complained of only existed after Harvest began processing food waste, and did not know the emissions from all sources at the Facility.

[223] Dr. Dalton was aware of complaints by residents that the Harvest odour had permeated their homes. She understands that gases that are heavier than air can settle into areas of lower elevation than their emission source. She is aware that the Facility is higher in elevation than much of Richmond, but does not think that a 10-metre difference in elevation is significant. She explained that air contaminants could get trapped if there was a temperature inversion and stagnant air, and the intensity of associated odours could increase until they disperse. She said that the longer that air contaminants stay at ground level, the greater the chance of potential health impacts.

[224] Dr. Dalton acknowledged under cross-examination that odours of quite high intensity were observed in the Dillon Consulting study, and moving towards the higher end of what would be considered offensive (which was contrary to her testimony that the Dillon data depicted odours at low levels, not at an intensity that would interfere with one's ability to enjoy being outdoors). She stated that she would expect concentrations or intensity of odours to be stronger closer to the

source. She agreed that if someone smells a strong odour 5 kilometers from its source then the odour would likely be greater closer to its source. She could not say, however, how much dilution would occur without more information about wind conditions.

[225] Based on her familiarity with modelling, Dr. Dalton agreed that modelling studies are only as valid as the quality of the data they reflect.

Chris Koscher

[226] Mr. Koscher is a senior air quality specialist at WSP Group (formerly Levelton Consultants Ltd.) based in Vancouver, BC. He has done many predictive odour dispersion assessments using emissions information from industrial sources and local meteorological data, and has been involved in other composting projects similar to Harvest's operations. He testified as an expert in air dispersion modelling assessment to predict potential odour impacts.

[227] Mr. Koscher's firm conducted an air dispersion model for Harvest in 2014 in order to comply with Harvest's previous Permit, using the most current version of the CALPUFF air dispersion model[9] and current meteorological data for the study area. That project was an update of its 2013 CALPUFF air dispersion modelling. Harvest retained Mr. Koscher's firm in 2018 to update the 2014 report.

[228] The 2018 modelling results were submitted to Harvest in a report dated March 16, 2018. The report included a brief description of the methodology, along with maps and satellite images of the Richmond area showing the location of perimeters or "contours" to illustrate the maximum 1-hour Odour Units and maximum 10-minute Odour Units predicted by the dispersion model for each of the scenarios described.

[229] The evidence before the Panel is that Odour Units are a form of odour measurement, similar to, but not quite the same as, decibels used to quantify sound. Generally, 1 Odour Unit represents something that 50 percent of people can smell using a dynamic olfactometer in a lab environment. Put another way, 1 Odour Unit is the perception threshold for an odour. The measurement of Odour Units is a system used by some researchers and regulators to estimate the degree of offensiveness of odorous emissions. Odour Units were the measure employed in the Koscher model, and relied upon as the indicator in Mr. Hottenstein's and Dr. Dalton's testimony. They were also discussed in the District Director's evidence.

[230] In presenting the methodology of the 2018 study, Mr. Koscher explained that he used the 2014 model data, with the addition of 4 quarters of 2017 emission data, for the Facility's biofilter units (referred to as Energy Garden Biofilter, Southwest Biofilter, Northeast Biofilter, and Screening Biofilter). In his view, using data from the 2014 model was appropriate because he considered the data representative of 2017. Mr. Koscher also said that the 2017 emissions for the biofilters were used in the 2018 modelling because the biofilters were believed to have been the "main culprit" producing higher Odour Unit emissions in the 2014

[9] CALPUFF is an advanced, integrated Lagrangian puff modeling system for the simulation of atmospheric pollution dispersion: https://en.wikipedia.org/wiki/CALPUFF

analysis. These data were from sampling events conducted in the second, third, and fourth quarters of 2017. Harvest provided him with emission values that he understood had been collected in a study by Environmental Odour Consulting.

[231] Mr. Koscher concluded that the 2018 dispersion model reliably predicted Odour Units at points over a specified area in the proximity of the Facility. Those modeled results were used to draw a series of maps with contour lines that depict 0.5, 1, 3, 5, 7, 10, and 20 Odour Units for quarters 2, 3 and 4 of 2017, for a predicted maximum of 1 hour and a predicted maximum of 10 minutes.

[232] The Panel notes that the expert witnesses at the hearing who described or relied on Odour Units in their testimony classify or describe Odour Units similarly, although the numerical ranges may differ slightly (e.g., 4 to 10 instead of 5 to 8, and 8 to 21 instead of 8 to 18, etc.). Mr. Koscher used the following classification:

1 OU – detectable

3 OUs – identifiable

5 to 8 OUs – annoying

8 to 18 OUs – very annoying

18 OUs & up – unbearable

[233] The modelling results provided in Mr. Koscher's report are presented in contours in 2 views: the second view is a "zoomed in" version of the first, using a satellite photo image instead of a map. The 0.5 Odour Unit contour only appears on the original view. The predicted maximum 10-minute Odour Unit results are based on the assumption that 10-minute maximum emissions will be 165% of the observed hourly averages, following a generally-accepted scientific protocol. According to Mr. Koscher's predictive model results, there were detectable odours outside of the Facility boundaries during each quarter modelled in 2017. Levels within 1 kilometre the Facility were predicted to be in the "very annoying" to "unbearable" range (10 to 20 Odour Units and higher) in all cases.

[234] Mr. Koscher explained that the dispersion model is based on gas diffusion rates and wind dispersion characteristics. Designed as a gas dispersion model, the model he used is also used to predict odour dispersion, on the assumption that the odours arise from, and therefore behave like, certain gases. He did not know whether Odour Units are proportional to gas concentration in parts per million, but said that the model implicitly assumes that is the case. He said that the models do not treat gases that are known to pool in still air or inversion conditions any differently from other gases.

[235] Mr. Koscher understood that the biofilter monitoring data for a given quarter were based on samples collected during the course of a single day. He did not know how variable the emissions from the Facility could be, and could not say if the samples were representative for a given quarter. Asked whether the results of his study had been validated, Mr. Koscher answered that he had not checked the modeled outputs against data from actual odour complaints, nor did he have any information as to whether the model reflects actual odour dispersion using the emissions and wind conditions at the time of an actual observation or complaint.

The District Director's evidence and submissions

[236] The District Director of Metro Vancouver has been granted legislative authority to manage air emissions from businesses within the regional district. Mr. Robb, in his capacity of District Director, issued the Permit to Harvest. Mr. Robb testified on his own behalf and did not call any other witnesses.

[237] Mr. Robb discussed his understanding of the policies and procedures for issuing permits, monitoring and enforcement programs implemented by Metro Vancouver, and the history and enforcement of the Permit. He explained that the Permit addresses what air contaminants may be emitted - and how much air contaminants are authorized - as guided by the regulatory framework. Mr. Robb's approach to managing odours is to authorize the discharge of air contaminants in a manner that is consistent with protection of the environment, while enabling businesses to operate in the public interest. He believes that compliance with the works and measures incorporated into the Permit, including the Sniff Test, will result in a reduction of odorous emissions from the Facility.

[238] Mr. Robb discussed the concept of Odour Units. Although not generally used for enforcement purposes - at least not in BC - Odour Units are used for illustration and planning purposes in odour dispersion modelling. (The Panel notes that this characterization is in keeping with Dr. Dalton's explanation and Mr. Koscher's testimony.)

[239] Mr. Robb said that there are no instruments that reliably detect odours (as compared to detecting chemicals that cause odours). Thus, to determine compliance with the Permit, he included the "Sniff Test".

[240] Mr. Robb explained that the odour perimeters or contours listed in Table 1 of the Permit (and those in the Amended Permit) are used for the Sniff Test. If the specified malodour emissions are exceeded, the District Director could take steps to ensure that Harvest stops receiving food waste and commingled waste for a specified period, until such time as the District Director determines that the source of the malodour has been addressed. For example, the District Director could issue an abatement order or could cause the business to shut down, either short-term or long-term. He explained that, as a regulator, his perspective is admittedly different from that of someone who just wants to breathe fresh air. The Permit is premised on reducing potential impacts to the community from air emissions, while meeting the needs of the community by processing compostable materials. He emphasized that the Permit does not authorize "pollution", as defined in the *Act* and the *Bylaw,* to occur.

[241] According to Mr. Robb, the Sniff Test perimeters are premised on air dispersion modelling used in the permitting process: it is premised on relating Odour Units relative to distance from the Facility. He illustrated this by drawing a series of diagrams for the Panel. By reference to the diagrams, Mr. Robb said that he recognized - and the model validated - that local residents who live or work near the Facility would likely experience annoying odours at their homes, notwithstanding the results of the Sniff Test. Reducing malodorous emissions at the source results in a proportionate reduction in corresponding odours relative to an observer's proximity away from the source.

[242] By reference to Table 1 of the Permit (and using the example of Mr. Zand and his family), Mr. Robb acknowledged that, on a given day, malodours from the Facility might be "acceptable" at the outer limits but unacceptable at the Zand's home. Mr. Robb also clarified that the dispersion of odours is difficult to model and can vary minute-by-minute due to factors such as fluctuations in emissions, and environmental factors such as variable air currents.

[243] Mr. Robb told the Panel that Metro Vancouver had put together a team to deal with complaints about odours from the Facility, but no one person was assigned to routinely monitor Harvest's odours. His staff does monitoring and enforcement activities for thousands of "clients", and an additional officer was hired because of the unprecedented number of complaints attributed to Harvest. He explained that, although an officer might initiate an inspection after detecting an odour, his enforcement staff typically just respond to complaints (although they also do routine field surveys).

[244] Mr. Robb provided a calendar of sampling events conducted during 2017. The calendar demonstrated 17 incidents in 2017 that would be considered "hits" (malodour from the Facility), 5 of which were considered a hit in March 2017. Based on those results, he issued an order requiring Harvest to stop receiving food and commingled waste between March 22 and March 24, 2017.

[245] In total, Metro Vancouver conducted 84 field surveys in 2017, but has not continued surveys at that frequency in 2018. According to Mr. Robb, the officers do fewer surveys now because the odours and the complaints attributed to the Facility have diminished. Mr. Robb estimated that it takes approximately 1 hour to dispatch someone to do follow-up after a complaint. Metro Vancouver has up to 30 officers in the field on a given day. Although most of their work is done during "office hours", they start monitoring activities in the morning - in keeping with when the odours are more likely to occur - and someone is on call for weekends and evenings.

[246] Mr. Robb testified that he would not object if, in Table 1 of the Amended Permit, the effective date of detecting emissions using the Sniff Test at the "nearest occupied residence" was sooner than the date in the Table, including starting on the date of his testimony.

[247] Under cross-examination, Mr. Robb agreed that some people are more sensitive to odours than others. He also agreed that not all of the complaints attributed to Harvest could be verified as coming from the Facility, and that there was a similar composting operation known as Enviro-Smart to the south of Richmond.

[248] Accepting that odour-causing byproducts emanate from decomposing food waste, Mr. Robb went on to say that the number of complaints has gone down considerably since Harvest stopped using parts of its operations that were identified as odour emission sources (he confirmed that the only parts of the Energy Garden still in operation - and emitting odours - are the Receiving Hall and its biofilter). Going forward, Mr. Robb understands that the remaining CASP will be taken out of service on June 1, 2019, leaving only the aging, screening, and storage piles. In addition, if the Anaerobic Digester is granted a permit or permit amendment to

allow it to operate, the digestate in the sealed tunnels will have to be disposed off-site.

[249] Mr. Robb clarified that the Anaerobic Digester and related processes cannot restart without a significant amendment to the Permit (or Amended Permit) and that the Energy Garden is not currently authorized for anaerobic composting. He said that notice of any significant permit amendment application will be provided to the public, including all of the Group Appellants. The Energy Garden operations will also be subject to a permit from the Vancouver Fraser Port Authority (the federal government agency) and, depending on the suggested additional operations such as a receiving transfer station, will also require a solid waste permit from the District Director.

The Panel's findings on whether the evidence meets the threshold or test: i.e., whether the Permit sufficiently protects human health and the environment, and prevents pollution.

Analysis of the expert evidence

[250] Harvest presented expert evidence from Mr. Hottenstein and Dr. Dalton on odour assessment, olfactory science, air quality and public/occupational health. These experts were testifying on different topics – Mr. Hottenstein on discerning odour at certain distances from the Facility's fenceline and the ability to discern the source of the odour using "dilutions of threshold" and FIDOL factors (frequency, intensity, duration, offensiveness, location of the odour), whereas Dr. Dalton focused on human's perception of odour in terms of detection and tolerance.

[251] Mr. Hottenstein concluded that it would be difficult to discern and differentiate odours from Harvest as compared to odours from similar sources in Richmond. He quantified the odour that he attributed to the Facility as being 2 on a scale of 10 – a "low level odour". In his opinion, it would be difficult to distinguish different odours and their sources at the Sniff Test perimeters in Table 1 of the Permit (3, 4 and 5 kilometers from the Facility). In his opinion, the Dillon Consulting study supported a conclusion that some odours were detected during their sampling events. However, in his view, the study did not confirm that the Facility was the source of these odours.

[252] Dr. Dalton testified with respect to the idiosyncratic and subjective nature of odour detection and tolerance. She testified that people tend to have a psychosomatic reaction to odours, but that some have this reaction more than others. She also testified that a person's reaction is independent of the actual strength of the odour. She also considered the data from the Dillon Consulting study, and was of the view that the data depicted odours at low levels, not at the intensity that she would consider unpleasant to the degree that it would interfere with one's ability to enjoy being outdoors. She did not experience what she considers "offensive" odours at the Facility. Further, based on the information that she considered, the odours from the Facility were not capable of injuring people, nor did she believe that the concentrations of odours from the Facility were capable of causing, or had caused, harm.

[253] Although not experts in dispersion modeling – Mr. Hottenstein stated that he prefers actual data to relying on models – Mr. Hottenstein and Dr. Dalton also reviewed the 2018 dispersion modeling report prepared by Mr. Koscher to help form their opinions in this case. Mr. Hottenstein commented on the use of Odour Units to describe and predict the strength and potential impact of odours. In his view, they are a useful tool, similar to "dilutions of threshold" or threshold intensity that he used as the basis for his opinions in this matter. While Mr. Hottenstein agreed it was possible that conditions at the site might have changed in the intervening period, he said he did not consider that in his opinion, since it was not specified in the dispersion modeling report.

[254] Dr. Dalton said that, based on her familiarity with air dispersion models, the data used could be "tweaked" to better represent a real-world situation, but stated that odour dilution characteristics are, nonetheless, consistent with the modelling results. She was familiar with the concept of Odour Units and characterized the perception of odours as: 1 Odour Unit is assumed to be the detection level, at 3 Odour Units the odour might be identifiable, and at 5 to 7 Odour Units the level might be objectionable for the use and enjoyment of the location.

[255] The Panel places little overall weight on the evidence of Mr. Hottenstein and Dr. Dalton regarding the intensity or offensiveness of odour experienced in the community. This is not intended as a comment on their relative expertise. Rather, their evidence, based on only brief visits to the Facility and environs and subjective assessment of odours, flies in the face of the multifaceted, truthful, real-world sustained observations of the Group Appellants and their witnesses. It is also inconsistent with the Dillon Report and the evidence of the Dillon Consulting witnesses called by Richmond, as well as the results of the Sniff Test "hits" as described by Mr. Robb. The technical witnesses describing the results of odour monitoring followed approved protocols, and the Panel found them to be credible, knowledgeable witnesses.

[256] Further, while the Panel accepts the generalizations about odours diffusing as the distance from source increases, the modelling that was done by Mr. Koscher, and on which Mr. Hottenstein and Dr. Dalton relied, clearly shows "very annoying" to "unbearable" Odour Unit levels for nearby residents.

[257] The Panel has also considered Mr. Koscher's modelling evidence. The Panel finds that the data used for the odour dispersion modelling may not have been representative of the air contaminants from the Facility, and the meteorological conditions that existed, on the occasions described by the Group Appellants and their witnesses. The Panel is of the view that the scenarios that were modelled, and the conclusions presented, do not appear to be representative of the conditions that gave rise to the complaints, and lack real-world authentication. In particular, the Panel finds that the model runs underestimated the extent of the odour in the community.

[258] As will be evident from the Panel's findings below, the odours from Harvest were identifiable – and identified – far beyond the limits indicated by the model, either because the model failed to reflect actual wind and weather conditions and the effect of temperature inversions and other weather events, or because the odorous emissions may have been much higher than the levels modelled. Further,

none of the model runs reflected the conditions that prevailed during the fall of 2016, when emissions soared to over 7 times (by reference to Odour Units) and over 10 times (for VOCs) more than they had been in the first half of the year, or what they were by the end of 2016 (Exhibit 17, Dr. Dalton's Report, at Tab 11 "Fraser Richmond Emissions and Complaint Data").

[259] Mr. Robb used Odour Units to illustrate the theory behind dispersion models, which are based on the diffusion of gases in still air modified by air currents. He did so in a manner consistent with Mr. Koscher's testimony on gas diffusion. Although not tendered as an expert witness, the Panel accepts Mr. Robb's evidence, based on his extensive experience with odour and air contaminants given his years of employment as the District Director. Amongst other things he stated that, assuming gas diffuses in all dimensions, the models might underestimate the lateral dispersion of odours that would be exemplified if atmospheric conditions prevent upward diffusion. This means that there is the potential that odorous gases will be dispersed laterally and, therefore, at higher concentrations and to a greater distance than if they had also diffused upwards. The Panel finds that this explanation is consistent with the experiences described by the Group Appellants.

[260] These shortcomings of the modelling notwithstanding, the Panel finds that using Odour Units to indicate how odours disperse is a useful way to envision something that exists but cannot be seen. The Panel also accepts that, despite the model's shortcomings with respect to "real-world authentication", the modelling principles are valid, and the modelling results demonstrate a likelihood of consistently higher Odour Units at locations nearer to the Facility. This is a logical conclusion that is clearly supported by the evidence of other witnesses.

[261] It is readily apparent from the evidence that air contaminants – in this case contaminants evidenced by odours emanating from the Facility – become significantly less noticeable as the distance from their source increases; conversely, the same odours will be consistently stronger (more concentrated) and likely more prevalent closer to the source. Put in terms of Odour Units: the number of Odour Units decreases as the distance from the source increases. This is represented conceptually as an inverse proportional linear relationship, showing Odour Units against distance from source. Either way, if an odour is strong enough to deter people from engaging in outdoor activities at a distance of several kilometres from the source then, based on the preponderance of the evidence, it will be much more unpleasant closer to the source.

Evaluation of totality of evidence

[262] Managing odours – and determining whether they constitute air pollution – can be challenging. The Panel accepts the evidence that it can be difficult to determine the source of an odour, let alone effectively measure its strength or concentration. Further, the Panel accepts the evidence that human perception of odour, and its effect on a person, tends to vary between individuals. For example, some people are hypersensitive to odours – or to specific types of odours - that others may find pleasant; some people may not detect a given odour, or can tolerate different odours at higher intensities. Odours can trigger physical reactions, for example if the compound is a chemical irritant to human tissues such

as lungs, nasal tissue or the eyes. Odours can also trigger idiosyncratic, psychosomatic responses.

[263] The evidence is clear that determining whether odour is negatively affecting human health, the environment, or whether odour establishes "pollution", is further complicated by factors such as frequency, duration and intensity of emission, odour chemistry, how the odour is dispersed in the atmosphere, and whether an odour is generally considered offensive.

[264] However, despite these challenges, the evidence before the Panel is that the Group Appellants, and their witnesses, have experienced one or more of the following impacts from odour - or air contaminants - coming from the Facility: inability to enjoy and participate in outdoor activities; a burning sensation and watery eyes; nausea and a feeling of not getting enough air.

[265] Based on a totality of the evidence, the Panel finds that the odours emanating into the community range from being detectable but tolerable, to being offensive or unbearable, depending on the receptor and the point in time. Moreover, based upon the compelling evidence of a number of the Group Appellants and their witnesses, and confirmed by the Dillon Report and Mr. Koscher's modelling, these high levels of odour can be, and are, experienced within the distances set out in Table 1 of the Sniff Test (i.e., less than 5, 4 and 3 kilometres from the Facility), while not necessarily reaching malodorous levels at the Table 1 sampling distances.

[266] Further, while Harvest is correct that there is no expert evidence establishing a cause-and-effect relationship between the Facility's emissions and the physical symptoms reported by several witnesses – and notwithstanding the Coastal Health Board's observations - there is expert evidence from Dr. Dalton that, at sufficient concentration, any chemical or odour *could* potentially have adverse impacts to human health or safety. The Panel notes that subsection 3(3)(a) of the *Bylaw* states that, to be an air contaminant, it is not necessary to prove that the air contaminant, if diluted at or subsequent to the point of discharge, *continues to be capable of harming, injuring or damaging a person, life form, property or the environment."* The Panel finds that the Facility has exceeded its authorized emissions and, accordingly, finds that there is a reasonable possibility that many of the reported symptoms can be attributed to air contaminants or odour from the Facility.

[267] With these considerations in mind, it is important to note that this case is not solely about whether the Facility has caused, or causes, adverse health effects. The effects are broader than that.

[268] The Group Appellants submit that the Permit – or the Amended Permit – does not protect the environment and prevent "pollution". Section 3 of the of the *Bylaw* defines "pollution" as:

> "pollution" means the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment.

[269] Based on this definition, "pollution" occurs when gases or particulate matter are introduced into the air in a manner or amount that "substantially" alters or negatively impacts "the usefulness of the environment."

[270] "Environment" is also a defined term in section 3 of the *Bylaw*, namely: "air, land, water and all other external conditions or influences under which humans, animals and plants live or are developed"; and "air" is defined as "the atmosphere", and restricts this definition, for the most part, to the above-ground and outdoor atmosphere.

[271] Given these definitions, the ambient environment – that which surrounds us in an immediate way, such as the air we are breathing – is a subset of the "environment". A detrimental environmental impact occurs when something in the air reduces the usefulness of the environment – including our ambient environment. That said, not all impacts or impairment equate to pollution.

[272] The Panel finds the evidence presented by the Group Appellants and their witnesses, individually and collectively, was credible and convincing, regarding the intensity and offensiveness of the odour they have experienced in the community. Further, although an odour will mix with other odours as it gets further from the source, the Panel finds that the evidence overwhelmingly supports a conclusion that odour from the Facility is identifiable. The witnesses from Dillon Consulting who performed the odour monitoring study in the community confirm this. They assessed odours from other sites, as well as from the Facility, and testified that odour from the Facility is distinct and recognizable. Further, some of the Group Appellants, and their witnesses, confirmed that the odour they experienced was coming from the Facility.

[273] In addition, the Panel finds that the level of predicted Odour Units from the conceptual modelling provides strong validation for the complaints reported by individuals near to the Facility.

[274] On a balance of probabilities, the Panel finds that, from time-to-time, there have been odorous emissions from the Facility that are offensive. The Panel further finds that these emissions have substantially altered and negatively affected the usefulness of the Group Appellants' environment: specifically, the odorous air contaminants have negatively affected the air they breathe and, accordingly, their lives, and potentially the health of local residents, including the Group Appellants and their witnesses.

[275] The Panel finds that the odorous emissions emanating from the Facility were not a one-time or infrequent event. All of the parties acknowledge that the odour was particularly bad in 2016, but has improved since the Permit was issued and, most significantly, after Harvest made changes to certain of its operations at the Facility. However, there is compelling evidence that, after the Permit was issued, significant odour continued to be experienced on occasion by a number of the Appellants. It had an adverse impact on their ambient environment and their lives. This indicates that the Permit was not adequately addressing the management of certain odorous air contaminants at the Facility.

[276] The Panel finds that the Group Appellants have established that:

(a) the Permit terms are not sufficient to protect human health and the environment, and

(b) at times, odorous contaminants from the Facility "substantially alter or impair the usefulness of" the environment.

[277] Accordingly, the Panel finds that the Group Appellants have met the threshold test in this case. The Panel finds that the Permit terms are not sufficient to protect human health and the environment, or to prevent pollution.

3. What is the appropriate remedy in the circumstances of these appeals? Specifically, what is the appropriate remedy given the terms of the Amended Permit?

[278] Some of the Group Appellants argue that the appropriate remedy in this case is to rescind the Permit and shut down the Facility. Others argue that the Permit terms ought to be made more restrictive. For instance, some of the Appellants submit that the Sniff Test parameters in Table 1 are inadequate to detect and address the odour from the Facility, and that the Panel should reinstate the previous Permit term of no odour past the plant boundary such that pollution occurs.

[279] Richmond supports amendments to the Permit requiring Harvest to implement its stated plans for winding down operations at the Facility. Richmond wants to ensure that the wind down occurs in a manner that does not impact the community, and prevents any future startup of the Anaerobic Digester or any other new aerobic or anaerobic composting operation at the Facility, without a new permit amendment or permit process. Richmond also welcomes further restrictions and clarity in the Permit.

[280] Harvest submits that it provides an essential and necessary service, a benefit to the community that comes at some cost to those who live in close proximity to the Facility. Harvest maintains that it carries out its operations in a reasonable manner and that its location is reasonable: it is mainly surrounded by the Agricultural Land Reserve and other industrial activities (the implication being that it is just another source of unpleasant odour in what is already an odorous environment). Further, with the planned phasing-out of its ability to receive and recycle food waste, Harvest submits that the Facility should be allowed to continue. It points out that having a valid Permit - or Amended Permit - is important because there will be composted material in the storage piles for years to come, and Harvest is ultimately required to rehabilitate the site back to bare land status and to remove all of the equipment, product, and waste from the site at final closure.

[281] In sum, Harvest submits that it has addressed the odour experienced by residents in a reasonable and responsible manner, and that odour will no longer be a concern given the planned changes: the Permit (or the Amended Permit) should not be revised or rescinded.

[282] The District Director submits that the Permit "in no way sanctioned or condoned malodorous emissions". The Permit does reflect, however, the tension between the need to manage air contaminants associated with organic recycling and the need for public safety.

[283] The District Director's role is to determine whether the benefits of the Permit outweigh any adverse impacts to the environment, and the District Director has the discretion to incorporate provisions in the Permit to achieve that balance. The 3.5-year term of the Permit reflects one aspect of this balancing act, enabling the District Director to review and revise the Permit as necessary in a shorter period of time than the usual 10-year term. Further, the Sniff Test is an insightful enforcement tool, and Mr. Robb has a "high level of confidence" that the regional district's officers can distinguish malodours as set out in this Permit (or Amended Permit) provision. He did acknowledge that, notwithstanding the predictive value of air dispersion modeling, he would prefer to rely on real world observations. He also stated, with regard to the Sniff Test perimeters set out in Table 1, that he would have no objection to establishing the point of monitoring "at the nearest occupied residence" immediately.

The Panel's findings

[284] In order to determine the appropriate remedy, the Panel has first considered the legislative objectives and considerations applicable to the permitting scheme. As the *Bylaw* is authorized under the *Act*, and most of its provisions "mirror" the provisions in the *Act,* the Board's past decisions on these matters are helpful.

[285] In *Shawnigan Residents Association et al. v. Director's Delegate, Environmental Management Act*, (Decision Nos. 2013-EMA-015(c), 019(d), 020(b) and 021(b), March 20, 2015) [*Shawnigan*], the Board considered the competing objectives of the legislative scheme at paragraph 284:

> … The *Act* provides a legislative scheme that authorizes the introduction of waste into the environment provided that any risk to the environment can be properly controlled, ameliorated and, to the extent possible, eliminated. In *Xats'ull*, the Board dealt with the competing interests in the overall scheme of the *Act* and, specifically, in regard to issuing a permit under section 14 of the *Act*, as follows:
>
> > 108. There is a tension inherent in this scheme. The tension is between protecting the environment and authorizing the introduction of waste into that same environment. Although the government has a broad goal or policy of protecting the quality of the environment for present and future generations, it is also faced with a society that generates a great deal of waste that needs to be disposed of. This waste includes "effluent" that, by definition, may injure or be capable of injuring the health or safety of a person, property or a life form, or may damage or be capable of damaging the environment. How can this waste be disposed of in a manner and still protect the environment?

> 109. The Panel finds that this *Act*, like its predecessor the *Waste Management Act*, reflects a policy of compromise. This policy was described by the BC Supreme Court *in BC Minister of Environment, Lands and Parks (MELP) v. Alpha Manufacturing* (1996), D.L.R. (4th) 688, as follows:
>
> > … it is abundantly clear from the *Waste Management Act* as a whole that it represents the legislative policy of controlling, ameliorating and where possible, eliminating the deleterious effect of pollution on the environment in a broad sense. The means adopted are in great measure the provision of permits and approvals before potentially polluting activities can be undertaken.
>
> 110. On appeal, the Court of Appeal expressly agreed with the conclusions above (*British Columbia (Minister of Environment, Lands and Parks) v. Alpha Manufacturing Inc.*, (1997), 150 D.L.R. (4th) 193 (B.C.C.A.)).
>
> 111. *Thus, the Act is not an example of a zero tolerance, or zero harm approach. Permits may be issued allowing waste into the environment (defined as the air, land, water and all other external conditions or influences under which humans, animals and plants live or are developed). The environmental impact of the waste is to be controlled, ameliorated and, where possible, eliminated*. [emphasis added]

[286] In recognition of the foregoing, the Panel emphasizes that a permit is not required to have zero impact or zero harm. Rather, as was stated by this Board in *Rolf Bettner on behalf of Haida Gwaii Marine Resources Group Association v. Director, Environmental Management Act*, (Decision No. 2005-EMA-007(a), March 20, 2006) at page 19:

> … a director exercising discretion under section 14 of the *Act* [the equivalent to section 11 of the *Bylaw*] must assess the potential risk of harm to human health and the environment associated with the proposed discharge of waste, and weigh those risks against the potential benefits of the activity and other societal interests. The information needed to properly assess a given permit application will depend on the circumstances of each case.

[287] This is consistent with subsection 4(c) of the *Ministry of Environment Act* which sets out the following as one of the purposes and objectives of the Ministry:

> (c) to manage, protect and conserve all water, land, air, plant life and animal life, having regard to the economic and social benefits they may confer on British Columbia…

[288] Some of the Group Appellants ask the Panel to rescind the Permit in its entirety. Many believe that the Facility should be shut down and relocated.

[289] The Panel finds that the Facility has social utility. As the Board observed in *Shawnigan,* above, humans produce waste and communities tend to generate a

wide variety of waste products from domestic, agricultural and industrial activities. Waste management is a critical part of societal health. One way or another, waste produced by humans needs to be disposed of while still protecting the environment and human health. Composting waste that would otherwise go into a landfill is, by-and-large, considered a desirable objective.

[290] The Panel has considered the fact that the composting operation at the Harvest site was in existence for several years before the Permit was issued, albeit as a smaller operation that processed only landscape waste. Its odours were apparently tolerated by the surrounding community. The increase in compostable waste generally, and food waste specifically, was related to a change in the way that local government endeavoured to manage organic waste. Authorizing a compost operation, while ensuring proper oversight and regulation, is one of the balancing acts contemplated by the legislative scheme: regulating such an operation under a permit has the benefit of setting emission levels, operating requirements, monitoring and reporting that can then be reviewed for compliance.

[291] The District Director had the authority under the *Bylaw* to issue the Permit. There is no evidence that there was any fatal procedural flaw in the decision to issue the Permit. While the evidence is clear that the odorous emissions were particularly persistent in 2016 and into 2017, the evidence also supports a finding that Harvest has reduced, and can further reduce, malodorous emissions to some degree. This indicates that the Permit is susceptible to amendment to address the odourous air contaminant issues. In particular, the Panel finds that the odour issues can be addressed by operational changes, and/or by adding additional conditions to the Permit. Accordingly, in the circumstances, the Panel finds that reversing (cancelling) the Permit is not an appropriate remedy.

[292] The Panel will now turn to consider whether the terms of the Amended Permit, and the operational changes planned for the Facility, will control, ameliorate and, if possible, address the concerns related to the Facility's emissions (*Toews & Stannus*, *supra*, page 18; *Shawnigan*, *supra*, page 51-2).

[293] As previously explained, the Permit has been amended as a result of a settlement reached between Harvest, the District Director, and Richmond. The Amended Permit is attached as Schedule "A" to this decision, and has been approved by the Panel in the companion decision. Amongst other things, the Amended Permit deleted authorization to operate the west CASP, added a receiving area as an emission source for air contaminants, and modified the permitting process in a manner that ensures there will be public consultation in the event that Harvest continues to use the Energy Garden.

[294] In terms of the Sniff Test, the perimeter distances and permitted duration of malodour, specified in Table 1, remain the same as in the Permit; however, the Sniff Test was amended to state that the District Director will monitor malodorous impacts of air contaminants emitted from the Facility at "or beyond" the distances specified in Table 1, and that the distance for monitoring was reduced to the "Nearest occupied residence" on April 1, 2019.

[295] The evidence is clear that the number of complaints – and the instances and intensity of malodour consistent with evidence of pollution from the Facility – has

decreased considerably since Harvest stopped using parts of its operations that were identified as odour emission sources. The Panel accepts that the odour attributed to the Facility became less prevalent when the Energy Garden, except for the Receiving Hall, was decommissioned. Mr. Robb confirmed that the only parts of the Energy Garden still in operation - and emitting odours - are the Receiving Hall and its biofilter. (Food waste continues to be mixed with vegetative material in the Receiving Hall before it is placed on the remaining CASP.) Mr. Aguinaga confirmed that the Receiving Hall was a source of odour when the main doors are opened.

[296] Further, the Amended Permit states that no discharge is authorized from the remaining CASP after June 1, 2019, unless it is replaced. Harvest confirms that it will not be replaced – which will leave only the aging, screening, and storage piles as authorized emission sources. In addition, the digestate material composted in the sealed tunnels of the Anaerobic Digester will have to be disposed of off-site. Any changes to those operational plans will require a new permit or a significant permit amendment.

[297] The Panel notes that, although the Group Appellants made general assertions that the emission limits in the Permit (and the Amended Permit) were too high, they did not provide specific evidence on which sources - or which contaminants - were causing or contributing to the odours at issue nor what the appropriate limits should be. This lack of evidence limits the Panel's ability to evaluate the authorized emissions. However, the Amended Permit includes, for each emission source, the "MAXIMUM EMISSION QUALITY: … No odours past the plant boundary such that pollution occurs." The Panel finds that this amendment to Maximum Emission Quality provides additional controls on emission sources. Based on the lack of additional evidence relating to emissions, the Panel will not make any changes to the specific emissions limits. This finding should not impact the goal of protecting the environment.

[298] The Group Appellants have established, however, that odorous contaminants from the Facility have negatively affected their environment at times amounting to pollution at distances closer than those in Table 1. Many of the Group Appellants argued that the Table 1 distances are unrealistic and insufficient to determine whether the Facility is protecting the environment or causing pollution. One of the Group Appellants submits that the effect of Table 1 is that it "legalizes" pollution within 5, 4 or 3 kilometres of the Facility (the distances specified in Table 1).

[299] The Panel finds that the complaints about the inadequacy of the monitoring distances in Table 1 are supported by Mr. Koscher's odour assessment modelling. Those contour maps demonstrate that the nearest residences (such as the Zand residence at 0.7 kilometres and the Brenzinger residence at approximately 1 kilometre from the Facility) could experience odours that are annoying to very annoying (at the 7 and 10 Odour Unit contours). That being the case, at the sampling distances of Table 1, the odours would be at (or lower than) 1 Odour Unit at 5 kilometres (detectable but not identifiable) and at 3 Odour Units or lower at 3 kilometres (the threshold at which odours are identifiable).

[300] This issue is addressed by the Table 1 distances being changed in the Amended Permit to "Nearest occupied residence" as of April 1, 2019. Although some of the operational changes set out in the Amended Permit should further

reduce the intensity and offensiveness of any odours that emanate from the Facility (in addition to the changes that have already been implemented), the Panel considers that establishing the Sniff Test monitoring point to the "Nearest occupied residence", combined with the District Director's broad enforcement authority, resolves this particular issue and is, thereby, appropriate to address the conditions at issue in this Decision.

4. Is Metro Vancouver's process for investigating complaints about odour from the Facility reasonable and appropriate?

[301] Many of the Group Appellants raised concerns that Metro Vancouver's response to their complaints about odour from the Facility were not addressed appropriately. Mr. Zand and Ms. Alavi testified that Metro Vancouver does not follow-up on complaints in a meaningful way. Ms. Brenzinger also wrote to Richmond and Metro Vancouver without apparent effect. She testified that she became frustrated that nobody seemed to be able to help, and that her complaints did not seem to make a difference.

[302] The Panel notes that the "Complaint Handling and Follow-Up Procedure of the Metro Vancouver Environmental Regulation and Enforcement Division" (October 24, 2016), provides a satisfactory procedure for following-up on odour complaints. More particularly, a Metro Vancouver officer is expected to conduct a complaint assessment within 1-hour of receiving the complaint. Once sufficient information is received, the officer telephones the suspected source to determine whether the current operating conditions might have resulted in unusual or excessive discharge of air contaminants. If the suspected source denies responsibility, or there are reasons to suspect serious impacts may be occurring, the officer is expected to visit the area to determine the source of the discharge and whether there are unauthorized discharges. The Panel concludes that it is important that this procedure be sustained to ensure the utility of the "Sniff Test".

[303] Implementation of this procedure in a consistent and predictable manner, triggered by accurate and timely citizen complaints, should provide additional incentive for the District Director to monitor and evaluate potential sources of malodour from Harvest's operations. Further, the Panel encourages officers to exercise their right of entry to the Facility. The benefits of site visits will increase the opportunities for the District Director to be proactive, and take the initiative to encourage compliance. In that context, the Panel notes that Harvest is required under the regulatory framework, and by the Amended Permit terms, to keep operational records and to make them available for inspection. The periodic inspection of these records will assist the District Director in monitoring the specific odour-producing activities.

[304] Provided that Harvest complies with the Amended Permit, as it states it will do, then there should be a harmonious few months ahead. With that objective at the forefront, the Panel encourages the District Director to add a staff resource to its team of compliance and enforcement officials, with the objective of assisting Harvest and the residents of Richmond to see the Amended Permit through to a successful conclusion. The Panel encourages Richmond to assist the District Director in that regard.

5. Given the planned changes to the Facility's operations, and the terms of the Amended Permit, are any further terms or conditions required in order to manage or address odorous air contaminants?

[305] The Panel was provided with information from Harvest and Mr. Robb about the Facility's future operations. Both the Permit and the Amended Permit require the replacement of the biofilter media at the Energy Garden (external to the Receiving Hall), at the remaining CASP, and the biofilter media at the finished compost screening area, by November 30, 2018 "or as required by the District Director". Harvest assured the Panel that it will do its best to comply with these requirements. According to Harvest and the District Director, Harvest intends to replace the biofilter media by November 30, 2018 at each of the specified emission sources, which should reduce odorous emissions. With Harvest's best efforts, and Metro Vancouver's proactive monitoring of Harvest's operations to ensure compliance, the Panel will not require any additional provision to ensure that the biofilter media gets replaced.

[306] Further, both Harvest and Mr. Robb assured the Panel that the Facility will stop receiving food and commingled waste by April 1, 2019[10], and that composting at the remaining CASP will be concluded by June 1, 2019. Moreover, the Panel notes Harvest's assurances, and the District Director's understanding, that no additional material from composting operations will be placed on the aging piles after June 1, 2019, with the exception of moving material from the remaining CASP. Notwithstanding the language of the Amended Permit, the Panel accepts that Harvest will stop accepting and processing food and commingled waste by April 1, 2019, but will otherwise continue to use its existing operations. Further, the Receiving Hall will effectively be taken out of operation. Harvest will be authorized to use the remaining emissions sources in accordance with the Amended Permit.

[307] In addition, Harvest does not plan to restart the Energy Garden (including no anaerobic digestion or consequent energy generation), unless it obtains either a new permit or significant permit amendment. Mr. Robb confirmed that a permit amendment application and the attendant public notice and consultation is required for anaerobic composting activities at the Energy Garden. Further, the Amended Permit requires a revised Digestate Odour Mitigation Plan to be approved before the anaerobic digestion process is reactivated.[11] The Panel notes that all other Amended Permit conditions, including (but not limited to) monitoring, recordkeeping, reporting, and the Facility's works and measures, will be in effect until April 30, 2020.

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[10] Harvest has agreed to stop receiving food and commingled waste after April 1, 2019. Therefore, the penalty for failing the Sniff Test, namely, "[T]he facility must immediately stop receiving, any food waste, including commingled food and yard waste…" will not have a meaningful impact after that date. However, the District Director has other enforcement tools available in the *Bylaw* should he determine that action needs to be taken in order to protect human health or the environment, or to prevent pollution.

[11] The Permit required a Digestate Odour Mitigation Plan to be submitted for approval by April 30, 2017 (page 45).

[308] Notwithstanding any language in the Amended Permit, the Panel is satisfied that Harvest's plan, corroborated by Mr. Robb's assurances relating to replacing the biofilters, limiting incoming waste materials to yard waste such as grass, branches, and other landscaping waste, and eliminating the CASP-related composting activities, are mandatory and will reduce odours from the Facility.

[309] The Panel also finds that compliance with, and enforcement of, the Amended Permit, including the revised the Sniff Test perimeter (namely, monitoring odour at the nearest occupied residence as of April 1, 2019), and the provision for each emission source, "Maximum Emission Quality: … No odours past the plant boundary such that pollution occurs", will protect the environment and prevent pollution.

[310] The Panel understands that Harvest will be conducting other activities at the Facility as it winds down the food and commingled waste operations. It is possible that these activities will trigger short-term emissions, some of which might amount to pollution beyond the plant boundary. The activities, as described during the hearing, could include removal of any remaining digestate for off-site disposal, demolition/replacement of the CASPs, or excavation of any remaining composted materials for off-site disposition.

[311] In the interest of continuing communications between Harvest, the District Director, and the Group Appellants, the Panel directs the District Director to require Harvest to notify the District Director, in advance, via registered mail and electronic copy, at addresses to be agreed between the parties, of activities at the Facility that are reasonably likely to cause a short-term increase in emissions from the Facility. This would include information such as the dates of the biofilter media replacements or removal, equipment removal, site decommissioning, and other activities at the Facility that have the potential to cause off-site malodour. The District Director should develop a method for providing this information to local residents, such as an update to the Metro Vancouver Harvest Fraser web page.[12] The Panel encourages Harvest to respond in good faith to resolve odour complaints triggered by these activities.

[312] The Panel finds that the remedy on these appeals must include ongoing participation from all parties and the greater community. The Panel encourages the Group Appellants (and others who believe that they have a valid odour complaint) to be vigilant in reporting their concerns - not just to Metro Vancouver - but to both Harvest and Richmond, and to make their concerns known to elected officials. That said, the Panel discourages frivolous or unfounded complaints, noting that "crying wolf" is counter-productive,. It encourages residents to recognize the nature and benefits of Harvest's operations to the greater community, and that the Permit (and Amended Permit) validly authorizes the emission of air contaminants from the Facility in accordance with the existing regulatory scheme, provided that they do not constitute pollution.

[313] The Panel notes that Richmond recognizes the social utility of Harvest's operations and has been proactive towards resolution of the public's concerns. For

[12] www.metrovancouver.org/services/Permits-regulations-enforcement/harvest-power-richmond/complaints/Pages/default.aspx

example, it has provided financial assistance to Metro Vancouver to hire additional staff to assist with odour complaints, retained Dillon Consulting to help clarify the issues, and has fully-participated in the Joint Appeals. Going forward, the Panel expects that Richmond will be a partner in the resolution of these issues, by continuing to support citizen complaints. Richmond is encouraged to develop an ongoing communication strategy with Metro Vancouver, Harvest and local residents.

[314] In closing, the Panel notes that several of the Group Appellants expressed a loss of trust in the responsible regulatory agency and in municipal officials. The Panel encourages Metro Vancouver officers to make it a priority to communicate in a timely and effective manner with individuals within the community, and to visit the Facility when consequential odour complaints are received and, from time-to-time, to determine compliance. In particular, Metro Vancouver is encouraged to review the required operating logs to assess whether adequate management strategies are conducted to minimize pollution. This proactive response will result in a clearer understanding of daily compliance activities, more effective monitoring of malodours, and allow greater certainty of the source and intensity of malodorous emissions. This type of interaction should also lend itself to relationship-building among all concerned.[13]

DECISIONS

[315] The Panel has considered all of the evidence and submissions, whether or not they have been specifically referred to.

[316] Section 103 of the *Act* gives the Board the authority to confirm, reverse or vary the decision under appeal, to send the matter back to the District Director, or to make any decision that the District Director could have made and that the Board considers appropriate in the circumstances.

[317] The Panel encourages the parties to recognize the social utility of the Facility but to continue to be vigilant in their collective efforts to recognize and eliminate air contaminants that amount to pollution beyond the boundary of the Facility.

[318] The Panel concludes that the issues raised by the Group Appellants have merit. The Panel also concludes that the changes to operations at the Facility, including the cessation of aerobic and anaerobic composting of food and commingled waste, the changes incorporated into the Amended Permit, including the new distances and frequencies stated in Table 1, and the restriction on odours beyond the plant boundary, should adequately resolve those issues.

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[13] The Metro Vancouver "Complaint Handling and Follow-up Procedure" acknowledges that "Each citizen deserves some assurance that steps are being taken to resolve their concerns. Staff must always make a reasonable effort to ensure that citizens' concerns are addressed in a timely and effective manner…. It is important to strike a balance between what is desirable from the public's perspective and what is practical and attainable from a resource perspective." Page 4.

[319] Despite the fact that the Group Appellants did not consent to the terms of the Amended Permit and decided to proceed with their appeals, absent the consent order in the companion case, there is no doubt that the Panel would have made some changes to the Permit in the circumstances, particularly in relation to Table 1. As such, the Group Appeals are allowed, in part.

"Norman E. Yates"

Norman E. Yates, Panel Chair
Environmental Appeal Board

"Teresa Salamone"

Teresa Salamone, Member
Environmental Appeal Board

"Howard Saunders"

Howard Saunders, Member
Environmental Appeal Board

May 21, 2019

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

PROPOSED AMENDED PERMIT GVA1088

Pursuant to:

Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008

and the BC Environmental Management Act, S.B.C 2003, c.53

Issued to:

Harvest Fraser Richmond Organics Ltd.

doing business as Harvest

(the "Permittee")

To Authorize:

the discharge of air contaminants to the air from

A Composting, Anaerobic Digester, and Combined Heat and Power Facility

(the "Facility")

Located at:

7028 York Road, Richmond, BC V6W 0B1

Effective Period:

The terms and conditions set out in the Permit apply to the existing or planned works as of September 4, 2018 and this permit will expire on April 30, 2020.

All previous versions of the Permit are invalid.

Issued: September 30, 2016
Amended: September 4, 2018

R.H. (Ray) Robb, P. Eng.
District Director

SECTION 1 – AUTHORIZED EMISSION SOURCES

Authorization to discharge air contaminants from the authorized Emission Sources and Works listed below is subject to the specified terms and conditions.

Approximate locations of the emission sources are shown on the Site Plan in section 4.

EMISSION SOURCE 01: Combined Heat and Power Unit discharging through a Stack(s).

MAXIMUM EMISSION FLOW RATE: **74** m^3/min
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:

1. 500 mg/m^3 Nitrogen Oxides corrected to 0°C and 5% O2
2. 100 mg/m^3 Sulphur Oxides corrected to 0°C and 5% O2
3. 1000 mg/m^3 Total Volatile Organic Compounds corrected to 0°C and 5% O2
4. 10 mg/m^3 Particulate Matter
5. 5% Opacity.
6. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:

GE Jenbacher JMS 320 GS-B.L internal combustion engine set firing biogas and associated heat recovery system (CHP) together with good combustion and operating practices.

Biogas supplied to the CHP must be desulphurized to less than 100 ppm Total Reduced Sulphur (as H_2S) prior to combustion. Desulphurization must consist of an alkaline scrubber maintained at pH greater than 8.0 and associated bioreactor and related appurtenances.

The Permittee must keep written records pertaining to the inspection frequency, engine condition and maintenance carried out on the GE Jenbacher engine, biogas desulphurization processes and related appurtenances. The records must be kept on site and be made available for inspection by Greater Vancouver Regional District Officers ("Officers").

The Permittee must not schedule maintenance, other than minor routine maintenance, on the CHP, biogas desulphurization unit or related appurtenances, between May and September inclusive, unless the Permittee submits for review and comment, at least 90 days in advance, a Facility Emissions Control Plan which includes but is not limited to:

(a) A timeline for the work, from initial curtailment leading to the shutdown until all biogas is diverted back to the CHP,
(b) Estimated daily emissions of TVOC (as methane), SO_2, and TRS (as H_2S) from Emission Sources 01, 02, 03, 05 and 06, from initial curtailment leading to the shutdown until all biogas is diverted back to the CHP, and
(c) Procedures to be taken to minimize emissions.

In the event of an emergency that requires unscheduled maintenance between the months of May and September inclusive the District Director must be notified as per Section 2E of this permit.

In addition to the maintenance requirements above, pH of the desulphurization scrubber is to be continuously monitored and maintained in a manner acceptable to the District Director.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 02: Emergency Flare discharging through a Stack(s).
MAXIMUM EMISSION FLOW RATE: **5** m^3/min
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y
MAXIMUM PRIMARY BURNER INPUT FIRING RATE: **0.1** GJ/h

MAXIMUM EMISSION QUALITY:
1. 5% Opacity.
2. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:
Smokeless flare equipped with a continuous propane fired pilot flame (with automatic re-ignition system) together with a diesel powered back-up generator and flow metering system using good combustion practices and operating procedures outlined in the approved Standard Operating Procedure.

Maximum number of hours the flare system is authorized for use in flaring biogas is 300 hours per year.

Scheduled maintenance (other than routine maintenance) must not occur between the months of May and September inclusive.

Upon any flaring event the Permittee must notify the District Director at the first available opportunity. If applicable, the cause(s) and remedial actions to prevent the recurrence are to be reported as soon as practicable. Notification must be made to Metro Vancouver's 24-hour number: 604-436-6777, or to regulationenforcement@metrovancouver.org

Times of flaring and estimates of volume of gas flared must be recorded in a manner acceptable to the District Director. Records of flaring events must be kept on site and be made available for inspection by Officers.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 03: Energy Garden Building discharging through a biofilter.
MAXIMUM EMISSION FLOW RATE: **1150** m^3/min
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. 17.5 mg/m^3 Ammonia
2. 10 ppbv Hydrogen Sulphide
3. 10 mg/m^3 Total Volatile Organic Compounds
4. No odours past the plant boundary such that pollution occurs.

By the later of January 31, 2020 or on the day the Anaerobic Digester is restarted,
$\mu g/m^3$ Total Aldehydes = as approved by the District Director,
$\mu g/m^3$ Total Ketones = as approved by the District Director,
$\mu g/m^3$ Total Amines = as approved by the District Director,
$\mu g/m^3$ Total Ammonia = as approved by the District Director,
$\mu g/m^3$ Total Reduced Sulphur Compounds = as approved by the District Director,
$\mu g/m^3$ Total Organic Sulphur Compounds = as approved by the District Director,
$\mu g/m^3$ Total Volatile Fatty Acids = as approved by the District Director, and
emission quality limits for other air contaminants as approved by the District Director.

WORKS AND PROCEDURES:

The Energy Garden building must be kept under negative pressure with all air to be collected and directed to the associated biofilter at all times and includes any time that any doors are open but not limited to the following:

Doors to the Energy Garden building (including man way doors) may be opened for the time required for a piece of equipment to enter or leave to:
(a) receive raw materials for processing in the associated anaerobic digestion percolation tunnels or for pre-treatment prior to placement on the CASP;
(b) remove materials from the percolation tunnels or processing area to be placed in the on-site covered aerated static pile (CASP) system or transferred offsite;
(c) receive or remove equipment;
(d) perform periodic maintenance or inspections of the tunnels, process area or any other associated areas located in this building.

Doors are to be closed at all other times.

The Permittee must maintain differential pressure gauges to monitor continuously and record weekly the differential pressure in the Energy Garden Building.

Doors to the Energy Garden building used for the receipt and removal of must automatically rapid open and close.

All highly-putrescible material other than packaged food waste must be received, handled, ground, and mixed inside a building kept under negative pressure, with all doors closed, and with all air collected and directed to approved emission control works. For clarity, food waste commingled with green waste is not considered highly-putrescible material.

All materials removed from the percolation tunnels must be processed and treated according to procedures in the approved revised Digestate Odour Mitigation Plan.

The Permittee must maintain good housekeeping practices in and around the Facility together with good operating practices at all times for all processing and emission control equipment.

The Permittee must maintain the biofilter in good operating condition and in such a manner that the biofilter media temperature is between 10 and 45 degrees Celsius, the moisture content of the biofilter media is between 40% and 70% by weight, and the pH of the biofilter is between 5.0 and 8.0.

The minimum biofilter dimensions authorized are 24.4 metres by 11.6 metres with a minimum media depth of 2 metres. Additional media must be placed on the biofilter within 3 days if TVOC concentrations from this source exceed authorized levels or the District Director determines based on inspection or complaint data that this source may be contributing to excess odour emissions. An alternate remedial action may be considered if supporting information is provided with the request.

The Permittee must conduct weekly visual inspections of the biofilter to determine if the biofilter is settling, channeling or cracking. The Permittee must measure and record the velocity, pH, pressure and temperature of the biofilter system on a monthly basis. The Permittee must maintain records of each inspection. The pressure drop across the biofilter must be measured and recorded on a weekly basis in a manner acceptable to the District Director

The biofilter media must be replaced by November 30, 2016 and thereafter within 24 months of the last replacement date, or as required by the District Director. Alternate media and replacement schedule may be considered if supporting information is provided with the request.

At the first available opportunity following the Permittee becoming aware that the biofilter is not in good working order, the Permittee must take all necessary steps to repair or correct any deficiencies. The Permittee must also report such deficiencies to the District Director as soon as possible and report any steps taken, or proposed to remedy the deficiencies within 7 days thereafter. Reporting must be made to regulationenforcement@metrovancouver.org.

If the above requirements are not being met the Permittee must take immediate steps to remedy the issue and inform the District Director as soon as possible.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

The Permittee must notify the District Director at least 30 days prior to restarting any Energy Garden operations, including restarting the Anaerobic Digester.

EMISSION SOURCE 04: Waste Receiving and Handling discharging through a Storage Pile(s).

MAXIMUM EMISSION FLOW RATE: **The authorized rate of discharge is that resulting from the stacking and reclaiming operations as well as stockpile wind erosion effects**
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:

All material handling, including screening, associated with this source must be conducted in such a manner as to minimize fugitive dust and odours together with good operating practices and procedures.

Yard Waste must be moved onto the CASP or into Energy Garden operations within seven days of receipt.

Food Wastes and all other putrescible and compostable material must be processed within 24 hours of receipt either by placing onto the CASP or into Energy Garden operations.

Any highly odorous material such as pure (non-commingled) food waste must be mixed with Yard Waste or other carbonaceous material within four hours of receipt.

By June 1, 2017, all highly-putrescible material other than packaged food waste must be received, handled, ground, and mixed inside a building kept under negative pressure, with all doors closed, with all air collected and directed to approved emission control works. For clarity, food waste commingled with green waste is not considered highly-putrescible material.

From June 1, 2017 to October 31, 2017 and from June 1, 2018 to October 31, 2018, the Permittee must limit the monthly receipt of commingled waste at this Source for subsequent placement on either CASP to a quantity that the District Director has determined to be 70% of the average monthly rate from June through October 2016. For clarity, this restriction does not apply to commingled waste processed in the Energy Garden.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

The Permittee must not use ES04 for receipt, storage or handling of materials when there is material at ES11. The Permittee must not use ES11 for receipt, storage or handling of materials when there is material at ES04.

The Permittee must notify the District Director 48 hours prior to switching operations between ES04 and ES11. After April 1, 2019, no waste material other than yard waste may be received at this source.

EMISSION SOURCE 06: Covered Aerated Static Pile Composting System Northeast discharging through a biofilter.
MAXIMUM EMISSION FLOW RATE: **1000** m^3/min
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. 80 mg/m^3 Total Volatile Organic Compounds
2. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:
The covered aerated static pile (CASP) composting system must be kept under negative pressure consistent with approved Best Management Practices for operation of such systems with all air exhausted to a biofilter.

The Permittee must maintain good housekeeping practices in the Facility together with good operating practices at all times for all processing and emission control equipment associated with this source.

Any highly odorous material such as pure (non-commingled) food waste must be mixed with Yard Waste or other carbonaceous material within four hours of receipt to achieve: moisture content between 50% and 60%, carbon-to-nitrogen ratio between 25:1 and 35:1, and bulk density less than 600 kilograms per cubic metre.

By April 1, 2018, the Permittee must not place digestate or any highly odorous material such as pure (non-commingled) food waste on any portion of the CASP unless that portion of the CASP has been replaced in accordance with the approved CASP Aeration System and Biofilter Replacement Plan.

Until May 31, 2017, CASP pile heights must not exceed 6.0 metres.

After June 1, 2017, CASP pile heights must not exceed 3.0 metres.

Permittee must keep a record of weekly measurements of pile height.

After June 1, 2019 no discharge from this source is authorized unless the entire CASP and biofilter has been replaced in accordance with the approved CASP Aeration System and Biofilter Replacement Plan.

An approved cover must be applied to all portions of the CASP less than 4 days old.

By January 1, 2017 the saturation oxygen concentration in the liquid phase in the CASP must be equal to or above 2.0 ppm for 80% of all measurements as determined by the approved oxygen monitoring plan.

By June 1, 2018 the saturation oxygen concentration in the liquid phase in the CASP must be equal to or above 2.0 ppm for 85% of all measurements as determined by the approved oxygen monitoring plan.

The Permittee must maintain the biofilter in good operating condition and in such a manner that the moisture content of the biofilter media is between 40% and 70% by weight and the pH of the biofilter is between 5.0 and 8.0.

Until March 31, 2019, the biofilter media temperature must be maintained between 25 and 60 degrees Celsius. By April 1, 2019 the biofilter media temperature must be maintained between 25 and 45 degrees Celsius.

The minimum biofilter dimensions authorized are 38.1 metres by 28.4 metres with a minimum media depth of 2 metres. Additional media must be placed on the biofilter within 3 days if VOC concentrations from this source exceed authorized levels or the District Director determines based on inspection or complaint data that this source may be contributing to excess odour emissions. An alternate remedial action may be considered if supporting information is provided with the request.

The Permittee must conduct weekly visual inspections of the biofilter to determine if the biofilter is settling, channeling or cracking. The Permittee must maintain records of each weekly inspection. The Permittee must measure and record the velocity, pressure and temperature of the biofilter system on a monthly basis. The pressure drop across the biofilter must be measured and recorded on a weekly basis in a manner acceptable to the District Director.

Biofilter media must be replaced by May 31, 2017 and thereafter within 18 months of the last replacement date, or as required by the District Director. Alternate media and replacement schedule may be considered if supporting information is provided with the request.

At the first available opportunity following the Permittee becoming aware that the biofilter is not in good working order, the Permittee must take all necessary steps to repair or correct any deficiencies. The Permittee must also report such deficiencies to the District Director as soon as possible and report any steps taken, or proposed to remedy the deficiencies within 7 days thereafter.

If the above requirements are not being met the Permittee must take immediate steps to remedy the issue and inform the District Director as soon as possible.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 07: Aging Piles discharging through a Storage Pile(s).

MAXIMUM EMISSION FLOW RATE: **The authorized rate of discharge is that resulting from the stacking and reclaiming operations as well as stockpile wind erosion effects**
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:

The placement of any material resulting from Anaerobic Digestion is prohibited at this source.

All material handling, which includes but is not limited to transfer from the CASP system, associated with this source must be conducted in such a manner as to minimize fugitive dust and odours.

The aging piles associated with this source must be covered with a minimum of 15 centimetres of cedar or screened middlings or any other high carbon or high alkaline, non-odorous cover material as soon as reasonably possible after they have been transferred from the composting area and finished being constructed into piles.

Aging pile dimensions must not exceed a height of 5 metres and a width of 10 metres in any direction.

The Permittee must keep a record of monthly measurements of pile height and oxygen concentration between 1.0 metres and 1.5 metres from the top of the pile

Permittee must minimize and mitigate the occurrence of anaerobic conditions at this source. Unless otherwise approved by the District Director, anaerobic conditions means temperature and oxygen concentration levels in the compost that result in a saturation oxygen concentration in the liquid phase of less than 2 mg/L (2 ppm). Permittee must maintain a log of remedial actions taken when anaerobic conditions occur.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 08: Finished Compost Screening discharging through a biofilter.
MAXIMUM EMISSION FLOW RATE: **552** m^3/min
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. 15 mg/m^3 Total Volatile Organic Compounds
2. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:
The screening of any material resulting from Anaerobic Digestion is prohibited at this source.

The partially enclosed screening operation must be exhausted to a biofilter at all times the Komptech XXL (or equivalent approved by the District Director) screener is in use.

The Permittee must maintain good housekeeping practices in the Facility together with good operating practices at all times for all processing and emission control equipment.

Scheduled maintenance (other than minor routine) on the primary screening unit is not to occur between the months of May through September inclusive unless this maintenance can be completed prior to the next screening event.

All material handling associated with this source must be conducted in such a manner as to minimize fugitive dust and odours together with good operating practices and procedures.

The Permittee must maintain the biofilter in good operating condition and in such a manner that the biofilter media temperature is between 10 and 45 degrees Celsius, the moisture content of the biofilter media is between 40% and 70% by weight, and the pH of the biofilter is between 5.0 and 8.0.

The pressure drop across the biofilter must be measured and recorded on a weekly basis in a manner acceptable to the District Director.

The minimum biofilter dimensions authorized are 7.9 metres by 22.9 metres with a minimum media depth of 2 metres. Additional media must be placed on the biofilter within 3 days if VOC concentrations from this source exceed authorized levels or the District Director determines based on inspection or complaint data that this source may be contributing to excess odour emissions. An alternate remedial action may be considered if supporting information is provided with the request.

The Permittee must conduct weekly visual inspections of the biofilter to determine if the biofilter is settling, channeling or cracking. The Permittee must maintain records of each weekly inspection. The Permittee must measure and record the velocity, pressure and temperature of the biofilter system on a monthly basis.
The biofilter media must be replaced by November 30, 2016 and thereafter within 24 months of the last replacement date, or as required by the District Director. Alternate media and replacement schedule may be considered if supporting information is provided with the request.

At the first available opportunity following the Permittee becoming aware that the biofilter is not in good working order, the Permittee must take all necessary steps to repair or correct any deficiencies. The Permittee must also report such deficiencies to the District Director as soon as possible and report any steps taken, or proposed to remedy the deficiencies within 7 days thereafter.

If the above requirements are not being met the Permittee must take immediate steps to remedy the issue and inform the District Director as soon as possible.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 08A: Finished Compost Screening Auxiliary Screener discharging through a Transfer Point(s).

MAXIMUM EMISSION FLOW RATE: **The authorized rate of discharge is that resulting from the stacking and reclaiming operations as well as stockpile wind erosion effects**
MAXIMUM ANNUAL OPERATING HOURS: 8760 h/y

MAXIMUM EMISSION QUALITY:
1. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:

The screening of any material resulting from Anaerobic Digestion is prohibited at this source.

At all times the material to be screened must satisfy at least one of the following three conditions:
(a) The organic material respiration rate is no more than 10 milligrams of oxygen consumed per gram of volatile solids per day as measured by direct respirometry using the TMECC Method 05-08-A – SOUR: Specific Oxygen Uptake Rate (April 7, 2002);
(b) The organic material emits no more than four (4) milligrams CO_2-C per gram of organic material per day, as measured using the TMECC Method 05-08-B – Carbon Dioxide Evolution Rate (April 7, 2002); or
(c) The organic material has a Solvita® Maturity Index of seven (7) or greater, as measured using the TMECC Method 05-08-E – Solvita® Maturity Test (April 7, 2002).

For up to 300 hours per year, material to be screened is exempt from the above conditions as long as all of the following conditions are met:
(1) the UBC Odour Risk Forecast does not predict a High Risk Condition,
(2) the Main Screener (Source 08) has been inoperable for more than 24 consecutive hours,
(3) the Main Screener (Source 08) is not expected to be operable within 48 hours, and
(4) the Permittee has notified the District Director prior to screening.

Notwithstanding the above, the Permittee must not screen anaerobic compost at this source. Unless otherwise approved by the District Director, anaerobic compost means compost with a temperature and oxygen concentration that results in a saturation oxygen concentration in the liquid phase of less than 2 mg/L (2 ppm).

All material handling associated with this source must be conducted in such a manner as to minimize fugitive dust and odours together with good operating practices and procedures.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 09: Overs, Middlings and Fines Storage Piles discharging through a Storage Pile(s).

MAXIMUM EMISSION FLOW RATE: **The authorized rate of discharge is that resulting from the stacking and reclaiming operations as well as stockpile wind erosion effects**
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:
The storage of any material resulting from Anaerobic Digestion is prohibited at this source.

All material handling associated with this source must be conducted in such a manner as to minimize fugitive dust and odours.

The Permittee must not store anaerobic compost at this source. Unless otherwise approved by the District Director, anaerobic compost means compost with a temperature and oxygen concentration that results in a saturation oxygen concentration in the liquid phase of less than 2 mg/L (2 ppm).

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 10: Finished Products Storage Piles discharging through a Storage Pile(s).

MAXIMUM EMISSION FLOW RATE: **The authorized rate of discharge is that resulting from the stacking and reclaiming operations as well as stockpile wind erosion effects**
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:
The storage of any material resulting from Anaerobic Digestion is prohibited at this source.

All material handling associated with this source must be conducted in such a manner as to minimize fugitive dust and odours.

The Permittee must not store anaerobic compost at this source. Unless otherwise approved by the District Director, anaerobic compost means compost with a temperature and oxygen concentration that results in a saturation oxygen concentration in the liquid phase of less than 2 mg/L (2 ppm).

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

EMISSION SOURCE 11: Waste Receiving and Handling discharging through a Storage Pile(s).

EFFECTIVE DATE: August 3, 2018

MAXIMUM EMISSION FLOW RATE: **The authorized rate of discharge is that resulting from the stacking and reclaiming operations as well as stockpile wind erosion effects**
MAXIMUM ANNUAL OPERATING HOURS: **8760** h/y

MAXIMUM EMISSION QUALITY:
1. No odours past the plant boundary such that pollution occurs.

WORKS AND PROCEDURES:
All material handling, including screening, associated with this source must be conducted in such a manner as to minimize fugitive dust and odours together with good operating practices and procedures.

Yard Waste must be moved onto the CASP or into Energy Garden operations within seven days of receipt.

Food Wastes and all other putrescible and compostable material must be processed within 24 hours of receipt either by placing onto the CASP or into Energy Garden operations.

Any highly odorous material such as pure (non-commingled) food waste must be mixed with Yard Waste or other carbonaceous material within four hours of receipt.

All highly-putrescible material other than packaged food waste must be received, handled, ground, and mixed inside a building kept under negative pressure, with all doors closed, with all air collected and directed to approved emission control works. For clarity, food waste commingled with green waste is not considered highly-putrescible material.

From August 3, 2018 to October 31, 2018, the Permittee must limit the monthly receipt of commingled waste at this Source for subsequent placement on the East CASP to a quantity that the District Director has determined to be 70% of the average monthly rate from June through October 2016. For clarity, this restriction does not apply to commingled waste processed in the Anaerobic Digester.

The Permittee must notify the District Director regarding any equipment brought on site that may materially affect emissions from this source.

The Permittee must not use ES04 for receipt, storage or handling of materials when there is material at ES11. The Permittee must not use ES11 for receipt, storage or handling of materials when there is material at ES04.

The Permittee must notify the District Director 48 hours prior to switching operations between ES04 and ES11. After April 1, 2019, no waste material other than yard waste may be received at this source.

EMISSION SOURCES 1 THROUGH 11: Facility Wide Emissions

The District Director will monitor malodorous impacts of air contaminants emitted from the Facility at or beyond the distances specified in Table 1. If the District Director determines on the balance of probabilities that malodorous impact from the Facility air contaminant emissions exceeds the limits specified in Table 1, then the Facility must immediately stop receiving, any food waste, including commingled food and yard waste, until such time as the District Director determines that the source of malodours has been addressed.

The District Director will base his/her decision on, but not be limited to, the following factors:

- Written reports of observations by (an) Officer(s) of malodours from the Facility for 10 minutes in any hour, at or beyond the distances in Table 1;
- Wind direction at the time of the observations; and
- The odour described in the observations.

For clarity, the impacts will be considered addressed if no malodours due to-Facility emissions of air contaminants are observed by an Officer at the distances and frequencies specified in Table 1, or the District Director is satisfied that adequate measures have been taken to address the cause of the malodour observations.

Table 1

Calendar year	Distance from Facility Fenceline	Maximum allowed number of days of malodour from Facility in any 14 day period
2017	5 kilometres	4 days
2018	4 kilometres	3 days
January to March 31, 2019	3 kilometres	2 days
April 1, 2019	Nearest occupied residence	2 days

SECTION 2 – GENERAL REQUIREMENTS AND CONDITIONS

A. AUTHORIZED WORKS, PROCEDURES AND SOURCES

Works and procedures, which this permit authorizes in order to control the discharge of air contaminants, must be employed during all operating periods of the related sources. The Permittee must regularly inspect and maintain all such works, procedures and sources.

The District Director must be provided with reasonable notice of any changes to or replacement of authorized works, procedures or sources, other than changes required for routine maintenance. Any changes to or replacement of authorized works, procedures or emission sources that may materially increase the Facility's emissions of air contaminants must be approved by the District Director in advance of operation.

The discharge criteria described in Section 1 of this permit are applicable on the issued or last amended date of this permit unless specified otherwise. If a date different to the issued or last amended date is specified, the existing works, procedures and sources must be maintained in good operating condition and operated in a manner to minimize emissions.

B. NOTIFICATION OF MONITORING NON-COMPLIANCE

The District Director must be notified immediately of any emission monitoring results, whether from a continuous emissions monitor or periodic testing, which exceed the quantity or quality authorized in Section 1 of this permit. Notification must be made to Metro Vancouver's 24-hour number: 604-436-6777, or to regulationenforcement@metrovancouver.org.

C. POLLUTION NOT PERMITTED

Notwithstanding any conditions in this permit, no person must discharge or allow or cause the discharge of any air contaminant so as to cause pollution as defined in the Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008 and the Environmental Management Act.

D. BYPASSES

The discharge of air contaminants that have bypassed authorized control works is prohibited unless advance approval has been obtained and confirmed in writing from the District Director.

E. EMERGENCY PROCEDURES

In the event of an emergency or condition beyond the control of the Permittee that prevents effective operation of the authorized works or procedures or leads to unauthorized discharge, the Permittee must:

1. Comply with all applicable statutory requirements;
2. Immediately notify the District Director of the emergency or condition and of contingency actions invoked or planned to mitigate adverse impacts and restore compliance; Notification must be made to Metro Vancouver's 24-hour number: 604-436-6777; and

3. Take appropriate remedial action for the prevention or mitigation of pollution.

The District Director may specify contingency actions to be implemented to protect human health and the environment while authorized works are being restored and/or corrective actions are being taken to prevent unauthorized discharges.

If an emergency situation results in a "spill" as defined in the Environmental Management Act Spill Reporting Regulation, the spill must also be reported immediately to the Provincial Emergency Program by telephoning 1-800-663-3456.

F. AMENDMENTS

The terms and conditions of this permit may be amended, as authorized by applicable legislation. New works, procedures or sources or alterations to existing works, procedures or sources must receive authorization in advance of operation.

G. STANDARD CONDITIONS AND DEFINITIONS

Unless otherwise specified, the following applies to this permit:

1. Gaseous volumes are corrected to standard conditions of 20 degrees Celsius (°C) and 101.325 kilo Pascals (kPa) with zero percent moisture.
2. Contaminant concentrations from the combustion of specific fuel types are corrected to the following Oxygen content, unless specified otherwise:
   - 3% O_2 for natural gas and fuel oil; or
   - 8% O_2 for wood fuel
3. Where compliance testing is required, each contaminant concentration limit in this permit will be assessed for compliance based on a valid test using test methods approved by the District Director.
4. Visual opacity measurements are made at the point of maximum density, nearest the discharge point and exclude the effect of condensed, uncombined water droplets. Compliance determinations are based on a six-minute average in accordance with the provincial "Source Testing Code for the Visual Measurement of The Opacity of Emissions from Stationary Sources". Continuous Emission Monitor System (CEMS) opacity compliance determinations are based on a one-hour average (taken from the top of each hour).
5. If authorized in Section 1 of this permit, standby fuel use is restricted to a maximum of 350 hours per year and to those periods during which the primary authorized fuel is not available. Fuel oil sulphur content must not exceed 15 milligrams per kilogram (mg/kg) and emissions during fuel oil firing must not exceed 10% opacity.
6. Definitions in the Environmental Management Act and Air Quality Management Bylaw apply to terminology used in this permit.
7. Threshold Limit Values (TLV) refer to the Time Weighted Average (TWA) exposure limits for substances specified in the American Conference of Governmental Industrial Hygienists Threshold Limit Values handbook, current on the latest date that this permit issuance or amendment came into effect.
8. Sulphur Oxides (SO_x) are expressed as Sulphur Dioxide.
9. Nitrogen Oxides (NO_x) are expressed as Nitrogen Dioxide.
10. The Canadian Council of Ministers of the Environment (CCME) "Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks (June 1995, CCME-EPC-87E)" must be adhered to for all applicable tanks unless otherwise stated in this permit.
11. Authorized 'Maximum Annual Operating Hours' of 8760 hours per year for an emission source is equivalent to authorization for continuous operation of the emission source for an entire calendar year, including leap years.

12. Any approval or determination made by the District Director under the terms of this Permit and after the effective date of this Permit is deemed to be a "decision" for the purposes of appeal under section 100 of the *Environmental Management Act*.

H. RECORDS RETENTION

All records and supporting documentation relating to this permit must be kept for at least three years after the date of preparation or receipt thereof, and be made available for inspection within 48 hours of a request by an Officer.

I. HEATING, VENTILATION, AIR CONDITIONING AND INTERNAL COMBUSTION ENGINES

Air contaminants discharged from any natural gas-fired heating, ventilation or air conditioning system for buildings and any internal combustion engine located at the discharge site must be maintained and operated in a manner prescribed by the manufacturer to ensure good combustion of the fuel with minimum discharge of air contaminants.

SECTION 3 – REPORTING REQUIREMENTS

A. MONITORING REQUIREMENTS AND REPORTING

Unless otherwise approved by the District Director prior to any sampling or analysis, all measurements must be performed by an independent agency in accordance with Metro Vancouver Air Emissions Sampling Program Manual of Methods and Standard Operating Procedures and the BC Ministry of Environment Field Sampling Manual, as they may be amended from time to time. Any variance from these procedures must receive prior approval from the District Director.

A minimum of 5 working days advance notice must be given prior to taking measurements required by this Monitoring and Sampling Program. Notification must be given to the Metro Vancouver Environmental Regulation & Enforcement Division (phone 604-436-6777, Fax 604-436-6707, email regulationenforcement@metrovancouver.org).

Unless otherwise specified, sampling must be performed under operating conditions representative of the previous 90 calendar days of operation. All field data and calculations must be submitted with monitoring results and they must be reported in the metric units which are used in this permit. These submissions must include process data relevant to the operation of the source of the emissions and the performance of the emission control works.

The Permittee must conduct the following monitoring and sampling and submit electronic reports of the results to the District Director by the dates specified below using a password enabled web based application provided by Metro Vancouver.

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
01	Within 45 days of restarting the CHP	On or before September 30 for each subsequent year, but not	Written report detailing the measured discharge rate and concentration of Particulate Matter, Sulphur Oxides (as SO_2), Nitrogen Oxides (as NO_2) and Total Volatile	Total Volatile Organic Compounds, Nitrogen Oxides, Sulphur Oxides,	EPA Test Method 25A, EPA Test Method 6C, EPA Test Method 7E,	Stack

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
		within six months following restarting the CHP	Organic compounds (as methane) in the emissions. Sampling must be conducted according to a sampling plan previously approved by the District Director. For the purposes of this requirement, "restarting the CHP" means continuous operation of the CHP engine for 72 continuous hours. Effective date: September 4, 2018	Particulate Matter	Metro Vancouver AQ02/02/1.00M	
06, 08, 03	October 31, 2016	Quarterly, on or before January 31, July 31 and October 31 of each year	Submit a written report including all consultant and laboratory reports detailing the Odour concentration and discharge rate in the emissions. Sample collection and analysis must be consistent with procedures specified in EN 13725:2003 "Air Quality– - Determination of Odour Thresholds by Dynamic Dilution Olfactometry". Equivalent methods may be proposed to the District Director at least 90 days prior to sampling. Hedonic tone must also be reported.	Odour Concentration	Those approved by the District Director	Monitoring– - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			Testing must be conducted once per calendar quarter. The report must be submitted no later than the last day of the first month of the following quarter. Testing and reporting is waived for the first calendar quarter (January, February, and March inclusive). Emission testing on the biofilters, as required within this permit, must be concurrent with Odour testing.			
01, 02, 03, 04 06, 07, 08, 08A, 09, 10, 11	As required by the District Director	As required by the District Director to a maximum of four times in a calendar year	The District Director may require the Permittee to undertake source testing at one or more specified sources to determine the quantity of emissions in odour units if the District Director determines that over a 7 day period an excessive number of complaints received by Metro Vancouver are attributable to the Facility, based on the balance of probabilities, and an approved Metro Vancouver staff member observes malodours from the Facility at a distance of five kilometres on two or more days within that 7 day period. Testing must be done within five working days of the District Director requiring it.	Odour Concentration	Those approved by the District Director	Monitoring– - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			The five working days advance notice requirement is waived for this testing. When required, the Permittee must submit a written report including all consultant and laboratory reports detailing the odour concentration and discharge rate in the emissions. Sample collection and analysis must be consistent with procedures specified in EN 13725:2003 "Air Quality-- Determination of Odour Thresholds by Dynamic Dilution Olfactometry". Equivalent methods may be proposed to the District Director at least 90 days prior to sampling. Hedonic tone must also be reported. The report must be submitted within 30 days of the District Director requiring the testing. Emission testing on the biofilters, as required within this permit, must be concurrent with Odour testing.			
08, 03, 06	October 31, 2016	Quarterly, on or before April 30, July 31, October 31 and	Submit a written report outlining and summarizing the following: The removal efficiency of Total Volatile Organic Compounds (VOCs) across each biofilter.	Total Volatile Organic Compounds	Those approved by the District Director	Monitoring-- Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
		January 31 of each year	The testing of VOCs at the inlet of each biofilter must include the volumetric flow rate, contaminant concentration and contaminant loading to that biofilter. VOCs must be reported on a total (as methane) basis. The testing of VOCs on the outlet of each biofilter must include the volumetric flow rate, contaminant concentration and contaminant loading from that biofilter. VOCs must be reported on a total (as methane) basis. Inlet and outlet testing must be conducted simultaneously unless otherwise specified. Sampling must be conducted according to a sampling plan previously approved by the District Director. The information provided by the inlet and outlet emissions concentrations must be used to			

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			determine the percent removal efficiency, by weight. Testing must be conducted once per calendar quarter. The report must be submitted no later than the last day of the first month of the following quarter. Testing of odour, as required within this permit, must be concurrent with emission testing.			
06	October 31, 2018	Quarterly, on or before, January 31, April 30, July 31, and October 31 of each year	Submit a written report outlining the results of testing for Total Volatile Organic Compounds (VOCs) from the surface of the CASPs. At least 90 days prior to conducting the testing a draft test plan, including rationale and proposed test protocols, must be submitted to the District Director for comment, revision and approval. Testing must be conducted once per calendar quarter. The report must be submitted no later than the last day of the first month of the following quarter. Testing must include volumetric flow rates and contaminant flux	Total Volatile Organic Compounds	Those approved by the District Director	Monitoring– - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			rates in grams TVOC (as methane)/square meter/second. Testing of odour, as required within this permit, must be concurrent with emission testing.			
03	Within 45 days of restarting the Anaerobic Digester	Annually, on or before July 31 of each year	Submit a written report of testing of specific odorous air contaminants from the outlet of the Energy Garden biofilters. The measurement reporting limit (the lowest concentration that can be measured by the selected method) for the outlet testing must be less than standardized published odour detection thresholds (the concentration at which an odour can be detected by 50% of the panel), of the following groups of compounds: aldehydes, ketones, amines, ammonia, reduced sulphur compounds, organic sulphur compounds, and volatile fatty acids. At least 90 days prior to conducting the testing a draft test plan, including rationale and proposed test protocols, must be submitted to the District Director for comment, revision and approval.	Odorous Air Contaminants	Those approved by the District Director	Monitoring– - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			Testing of odour, as required within this permit, must be concurrent with emission testing.			
03	September 30, 2017	Annually, on or before September 30 of each year	Submit a written report outlining and summarizing the following: The removal efficiency of hydrogen sulphide, Total Reduced Sulphur Compounds (TRS) and ammonia. The testing of hydrogen sulphide, TRS and ammonia at the inlet to the biofilter must include the volumetric flow rate, contaminant concentration and contaminant loading to the biofilter. TRS must be reported on a total (as H_2S) basis. The testing of hydrogen sulphide, TRS and ammonia at the outlet of the biofilter must include the volumetric flow rate, contaminant concentration and contaminant loading from the biofilter. TRS must be reported on a total (as H_2S) basis. Inlet and outlet testing must be conducted simultaneously unless otherwise specified.	Hydrogen Sulphide, Total Reduced Sulphur Compounds, Ammonia	Those approved by the District Director	Monitoring– - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			Sampling must be conducted according to a sampling plan previously approved by the District Director. Testing must be conducted during tunnel unloading, and with all building doors closed for at least 30 minutes prior to and during sampling. The measurement reporting limit (the lowest concentration that can be measured by the selected method) for the outlet testing must be less than standardized published odour detection thresholds (the concentration at which an odour can be detected by 50% of the panel). The information provided by the inlet and outlet emissions concentrations must be used to determine the percent removal efficiency, by weight. Testing of odour, as required within this permit, must be concurrent with emission testing.			

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
04, 09, 10, 11	October 31, 2016	Annually, on or before October 31 of each year	Submit a written report including all consultant and laboratory reports detailing the Odour concentration and discharge rate in the emissions. Sample collection and analysis must be consistent with procedures specified in EN 13725:2003 "Air Quality– - Determination of Odour Thresholds by Dynamic Dilution Olfactometry. Equivalent methods may be proposed to the District Director at least 90 days prior to sampling. Hedonic tone must also be reported. This odour testing must be conducted concurrently with other odour and emission testing as required within this permit. For ES04 and ES11, testing must occur at the one source that is actively in use at the time of testing.	Odour Concentration	Those approved by the District Director	Monitoring– - Other
07	October 31, 2016	Annually, on or before October 31 of each year	Submit a written report including all consultant and laboratory reports detailing the Odour concentration and discharge rate in the emissions as well as the Solvita Maturity Index of the material moved from the CASP and placed for curing.	Odour Concentration	Those approved by the District Director	Monitoring– - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			Hedonic tone must also be reported. Odour sample collection and analysis must be consistent with procedures specified in EN 13725:2003 "Air Quality – Determination of Odour Thresholds by Dynamic Dilution Olfactometry". Equivalent methods may be proposed to the District Director at least 90 days prior to sampling. Solvita Maturity Index must be consistent with TMECC Method 05-08-E. Solvita Maturity testing must be conducted at the beginning of the curing stage and prior to being covered. Odour testing must be conducted within one day of the curing pile being covered. This odour testing must be conducted concurrently with other odour and emission testing as required within this permit.			
06	April 30, 2017	Quarterly, on or before July 31, October 31 and January 31, and April 30 of each year	Submit a written report outlining the results of monthly oxygen concentration (in ppm) and temperature (in degrees Celsius) measurements in the CASPs, as well as the corresponding saturation	Oxygen concentration, temperature, saturation oxygen concentration	Those approved by the District Director	Monitoring - other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	PARAMETER(S)	TEST METHOD	REPORT TYPE
			oxygen concentration (in ppm) conducted during the previous calendar quarter according to the approved plan. This report must also include any remedial actions taken to address any readings equivalent to a saturation oxygen concentration less than 2.0 ppm.			
01, 02	October 31, 2016	Within 45 days of restarting the CHP and then annually on or before October 31 of each subsequent year, but not less than six months following restarting of the CHP	Submit a written report including all consultant and laboratory reports detailing the Total Reduced Sulphur (TRS) concentration in the biogas that is directed to the combined heat and power unit or the flare systems from the previous calendar month. Sampling must be conducted according to a sampling plan previously approved by the District Director. Emission testing, as required within this permit, must be concurrent with TRS sampling. For the purposes of this requirement, "restarting the CHP" means continuous operation of the CHP engine for 72 continuous hours.	TRS	Those approved by the District Director	Monitoring - other

B. INFORMATION REPORTING REQUIREMENTS

The Permittee must submit electronic reports containing the required information to the District Director by the dates specified below using a password enabled web based application provided by Metro Vancouver.

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	REPORT TYPE
Facility	March 31, 2017	On or before March 31 for each subsequent year	Submit a written report in a format approved by the District Director providing details of the types and amounts of principal products produced and principal raw materials used in the preceding calendar year. The principal raw materials diverted to the CASP must be broken down into the following categories: - Commingled municipal curbside "greenbin" wa`ste (yard waste/food waste) - ICI source separated organics (this must be further separated into vegetative and non vegetative/mixed subcategories) - Yard Waste, land clearing debris and clean wood waste - Material from the energy garden - any other materials not specifically noted Principal raw materials must be reported as "as-received" (wet) tonnes. In addition to the above, the principal raw materials used in the Energy Garden or sent offsite to other compost facilities or sites must be reported and must be broken down into the following categories:	Materials and Products

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	REPORT TYPE
			- Commingled municipal curbside "greenbin" waste (yard waste/food waste) - ICI source separated organics - Green Waste - any other materials not specifically noted Principal products must include tonnes of finished compost, sulphur and cubic metres of biogas produced as well as total megawatts of electricity produced.	
01, 05, 06, 02, 08, 03, 04, 07, 08A, 09, 10, 11	March 31, 2017	On or before March 31 for each subsequent year	Submit a written report providing details of the total number of hours and days operated in the preceding calendar year. Records are to be maintained in a written bound log or other format approved by the District Director.	Operating Period
01, 05, 06, 02, 08, 03, 04, 07, 08A, 09, 10, 11	December 31, 2016	On or before September 31 for each subsequent year	Submit a written report outlining planned maintenance and capital activities, including timelines, for the control works associated with the sources, for the 12 months beginning October 1 of the current calendar year and ending the following September 30. This report must include but not be limited to the following: - Inspection schedules for all biofilters and related equipment, including the CASP ventilation systems, - Replacement schedules for biofilter media, - Identification of any activities deferred from or cancelled in the preceding 12 months, including rationale for those deferrals or cancellations, - Plans for additional maintenance and improvements for the coming year.	Information - Other
01, 05, 06, 02, 08, 03	October 31, 2016	Quarterly, on or before April 30, July 31, October 31 and January 31 of each year	Submit a written report outlining measures taken during the preceding calendar quarter or proposed to improve the efficiency of the emission control works, including maintenance activities on the control works associated with these sources. This report must include but not be limited to the following: - Inspection (including frequency) of the biofilter odour control system for each source, - Maintenance of and repairs to pipes in the CASPs,	Information - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	REPORT TYPE
			- Inspection of the emergency flare and CHP systems and, - a summary of the findings as determined from the inspections regarding the condition of works and related appurtenances and all remedial action(s) taken or proposed to solve any problems noted. Records are to be maintained in a manner and format acceptable to the District Director.	
Facility	July 31, 2017	On or before July 31 for each subsequent year	Submit for review and comment by the District Director an update to the written Progressive Odour Management Plan (POMP) prepared by a Qualified Professional. For the purposes of this permit, a Qualified Professional is an individual registered with a professional organization who has the necessary education, experience, accreditation and knowledge and may be reasonably relied on to provide advice related to the POMP because it is within his or her area of expertise. The plan must include procedures that could be implemented under various meteorological and operational conditions to reduce odours and include, but not be limited to, options to limit the operations of the auxiliary screener where operationally feasible. The Permittee will also investigate and consider additional options in the POMP that may be implemented to reduce odours. The Permittee will continue to investigate and consider supplemental fugitive dust mitigation systems to be used as back-up measures and include these option(s) in the Plan. This plan must include but not be limited to the following activities surrounding prevention, accountability and progressive mitigation: Prevention can include the development of standard operating procedures to prevent release of odorants to the environment (i.e preventative maintenance, leak detection and repair in the CHP and other units), feedstock handling, review of feedstocks etc.). This must also include the handling of digestate and other residuals from the Energy Garden percolation tunnels and the	Information - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	REPORT TYPE
			depackaging unit, and use of the UBC Odour Risk Forecast to avoid high risk activities. Accountability can include the development of responsibility charts, contact info, response procedures to upset conditions, response to odour complaints, communication plans etc. Progressive mitigation can include several levels of response which can include: self detection, correction and reporting, implementation of new or changing of existing operational procedures, restriction of feedstocks and ultimately retrofitting of technologies or controls works if so required. Subsequent year submissions must consider any recommended updates to the plan and a summary of any findings, responses and proposed remedial actions as outlined by the plan. For greater clarity the Permittee is not required to implement the remedial actions or other improvements and procedures contained within the report.	
01, 02, 03, Facility	October 31, 2019	As required by the District Director	Submit for review and comment a written report of the results of a dispersion modelling assessment of specific odorous air contaminants and odour units. Modelling must be conducted in accordance with the most recent version of the British Columbia Air Quality Dispersion Modelling Guideline. The dispersion model plan must be developed using the most recent version of the Metro Vancouver dispersion model plan template and submitted to the District Director for review, comment, revision and approval by February 28, 2019. This report must be based on emission measurements collected during normal operation and reasonable estimates where measurements do not exist, as agreed to in the dispersion model plan. Model scenarios must also include any modifications made (or proposed) to reduce emissions and improve dispersal of odours and emissions in the community.	

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	REPORT TYPE
			A draft final result report must be submitted for review by and comments from the District Director by August 31, 2019.	
08, 08A	October 31, 2016	Quarterly, on or before April 30, July 31, October 31 and January 31 of each year	Submit a log that includes all dates and times when the finished compost screening was operated during the previous calendar quarter. This log must include but not be limited to dates of operation, start and stop times, total daily operating hours for each source, UBC Odour Risk Forecasts for each day, any curtailment actions related to screening, and any mechanical failures. Remedial actions regarding mechanical failures must also be reported as per Section 2 of this permit.	Information - Other
01, 02, 03, 04, 07, 08, 08A, 09, 10, 11, Facility	The later of November 30, 2019 or 90 days after restarting the Anaerobic Digester	N/A	Submit for review and approval a written Facility Odorous Emissions Impact Assessment report assessing the performance of upgrades made since 2016 along with a detailed Facility Odorous Emissions Impact Abatement Plan (collectively the "Plan") to address any remaining performance gaps, taking into account all Facility emission sources. This Plan is to be prepared by an independent third party Qualified Professional. For the purposes of this Permit, a Qualified Professional is an individual registered with a professional organization and who has the necessary education, experience, accreditation and knowledge and may be reasonably relied on to provide advice related to the Plan because it is within his or her area of expertise. The Plan must propose improvements to odorous air contaminant prevention, collection, treatment and dispersion, and include engineering cost estimates and proposed timelines for implementation of new control works. The Plan must be supported by dispersion modelling.	Information – Other
05, 06	November 30, 2016	N/A	Submit for review and approval a written Oxygen Sampling Plan which will assess the monthly saturation oxygen concentration via measurement of oxygen concentrations and temperatures within the covered aerated static	Information - Other

EMISSION SOURCE	INITIAL DUE DATE	SUBSEQUENT DUE DATES	REQUIREMENT	REPORT TYPE
			piles following the guidance as outlined in the UK Environment Agency Odour Technical Guide 3 (version 1.0 19-July-2012). The sampling plan must include the following: • Type of oxygen probe to be used including technical specifications • Type of thermocouple to be used including technical specifications • Depth at which measurements are to be taken • Number of measurements per pile • Plan drawing of measurement locations in each pile, including coordinates • Sampling and mitigation procedures where measured saturation oxygen concentration is less than 2.0 ppm	
03	December 31, 2016	N/A	Submit for review a written Digestate Treatment Pilot Design Plan which details options, with specific actions and timelines, to be investigated for management of percolation tunnel digestate in order to minimize odours.	Information - other
03	No less than 90 days prior to restarting the Anaerobic Digester	N/A	Submit a permit amendment application to the District Director to restart the Anaerobic Digester for review and approval to include a revised written Digestate Odour Mitigation Plan which describes how percolation tunnel digestate will be processed and how odours from such processing will be mitigated prior to its removal from the Facility.	Information - other
03	90 days prior to restarting the Anaerobic Digester	N/A	Submit for review and approval a written proposal with recommendations for emission limits for the biofilter associated with the Energy Garden for the following groups of odorous air contaminants: total aldehydes, total ketones, total amines, total ammonia, total reduced sulphur compounds, total organic sulphur compounds, and total volatile fatty acids. The proposal must be supported by dispersion modelling.	Information – other

C. AMENDED OR ADDITIONAL REQUIREMENTS

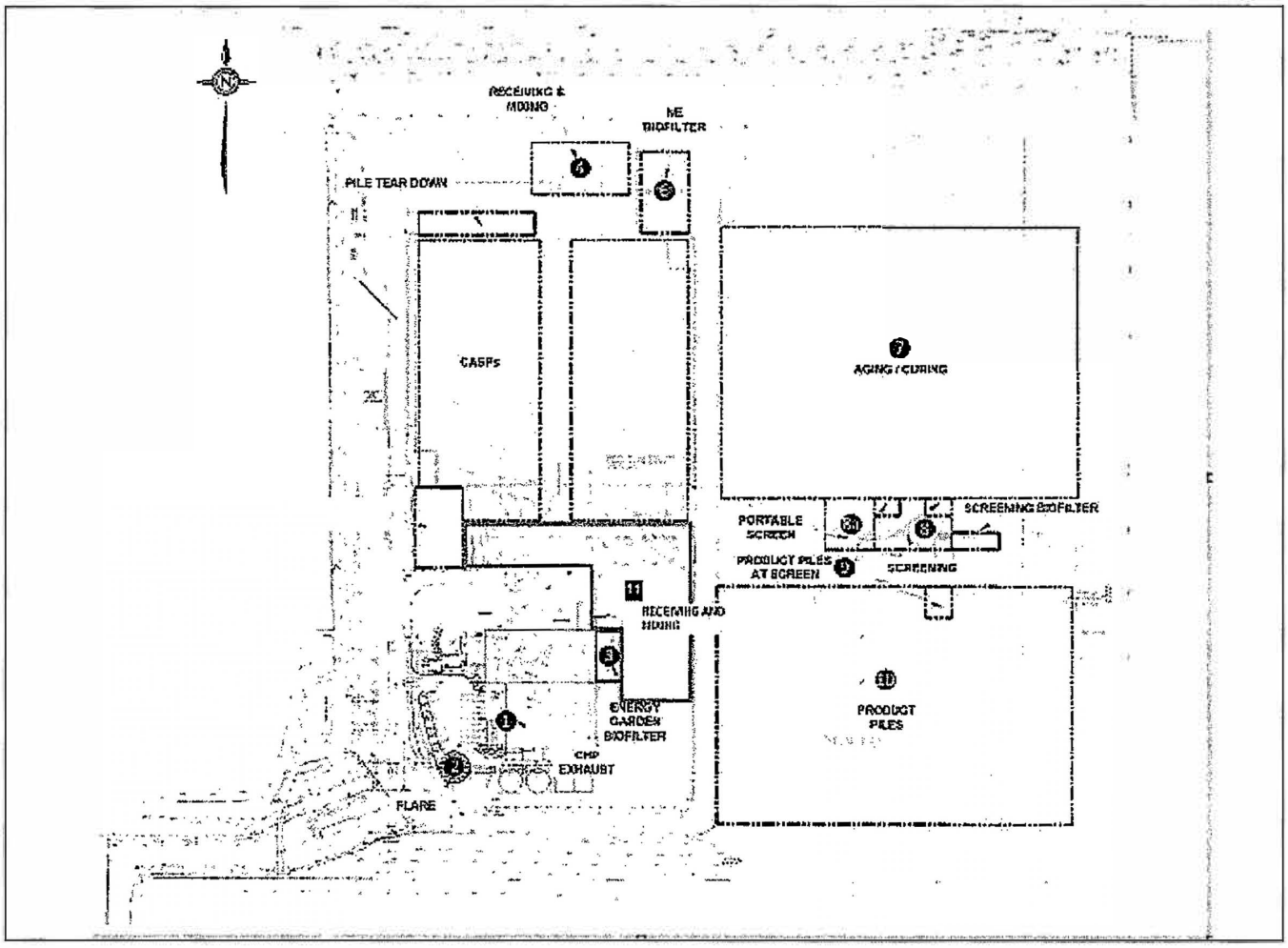
Based on the results of the monitoring program, including the stack sampling results or any other information, the District Director may:

1. Amend the monitoring and reporting requirement of any of the information required by this Permit including plans, programs and studies.
2. Require additional investigations, tests, surveys or studies.

SECTION 4 – SITE PLAN

LEGAL DESCRIPTION OF DISCHARGE SITE: **to a portion of the land described as Lot 3 Sections 13 and 14, Block 4 North, Range 5 West, Plan 74529, New Westminster District.**

The following site plan is not to scale and the locations of the discharge points are approximate.



Date Issued: September 30, 2016
Date Amended: September 4, 2018