

# Report to Council



**Date:** March 19, 2018  
**File:** ASP12-0001  
**To:** City Manager  
**From:** Policy & Planning & Utility Services Departments  
**Subject:** Diamond Mountain Area Structure Plan Consideration

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## 1.0 Recommendation:

THAT Area Structure Plan Application No. ASP12-0001 to amend Map 4.1 in the Kelowna 2030 – Official Community Plan Bylaw No. 10500 by changing the Future Land Use designation for portions of:

- Lot B Section 9 Township 23 ODYD Plan 30819 Except Plan 38902, located at 2250 Galiano Road, Kelowna, BC;
- Lot A Sections 9, 10 and 16 Township 23 ODYD Plan 30819 Except Plan KAP81434, located at 1555 Glenmore Road North, Kelowna, BC; and
- Lot 1 Sections 9 and 10 Township 23 ODYD Plan 1884 Except Plan 31642, located at 855 Packinghouse Road, Kelowna, BC

from the FUR – Future Urban Reserve designation to the REP – Resource Protection Area, S2RES – Single / Two Unit Residential, and S2RESH – Single / Two Unit Residential – Hillside, MRL – Multiple Unit Residential (Low Density), MRM – Multiple Unit Residential (Medium Density), COMM – Commercial, and PARK – Major Park / Open Space (Public) designations, as shown on Map “A” attached to the Report from the Policy & Planning and Utility Services Departments dated March 19, 2018 NOT be considered by Council.;

AND THAT Council direct staff to further investigate the nuisance analysis as it relates to the Glenmore Landfill Fill Plan and report back on mitigation and preventative options as it relates to adjacent land uses, on-site activities, and financial impacts to the City of Kelowna.

## 2.0 Purpose

To receive for information, the Diamond Mountain Area Structure Plan, and to not endorse ASP12-0001 and the corresponding amendments to the Official Community Plan.

### 3.0 Corporate Analysis & Summary

The Official Community Plan has designated the subject properties as Future Urban Reserve, with an expectation of exploring development opportunities that would be context sensitive and accommodate growth that would complement the North Glenmore and UBCO campus area needs. The growth strategy of the 2030 OCP anticipated approximately 440 units, which was a very high level estimate and required further technical analysis to more accurately substantiate the full development potential. Through the corresponding Area Structure Plan (ASP) exercise, the applicant team estimates approximately 1,000 residential units would be constructed at full build out of this site.

It is noteworthy to underscore that the development parcels are sited immediately to the south of the Glenmore Landfill, a facility serving the entire Central Okanagan, from Peachland to Big White, which is envisioned to have a life expectancy of up to 75 years. The Glenmore landfill is the only disposal facility serving the Region as identified in the Regional Solid Waste Management Plan. While it was anticipated that some mitigating measures would need to be explored to accommodate development on this greenfield parcel, the complex technical nature of the associated 'nuisances' were not understood, nor investigated, at the time this ASP was included in the OCP (2011). This feasibility analysis is precisely the reason why an ASP process is undertaken. The unique nature of a landfill nuisance analysis added complexity to the review of the ASP and staff have relied on the assistance of third party experts to adequately understand these potential impacts and appropriate development responses.

It has been concluded by accredited technical experts and staff that residential development as proposed will be negatively impacted by visual, odour, noise and dust nuisances created by landfill and composting operations. This is likely to result in complaints to Council and the Ministry of Environment adding pressure to either spend significant tax dollars on modifications, relocate or close City facilities. This conclusion is based on the following:

1. The site is adjacent to the minimum landfill buffer zone as specified in the Landfill Criteria for Municipal Solid Waste. While being outside the buffer zone, this hillside development overlooks the landfill and compost facilities. It will be extremely difficult to screen the facilities resulting in significant visual nuisance;
2. A significant portion of the development is within 400 metres of our existing and future compost site, in contravention of the Provincial "*Compost Facility Requirements Guideline: How to Comply with Part 5 of the Organic Matter Recycling Regulation*" which states that the buffer zone for residential development should be a minimum of 400 to 1,000 metres;
3. Results of nuisance modelling by GHD consultants demonstrating the level of nuisance impact on the site for odour, dust and especially noise. The consultants, based on their professional experience and the results of the modelling study, recommend a zone of residential exclusion that incorporates most of the dwelling units in the proposed ASP;
4. City of Kelowna experience with managing odour nuisance in the area near our Regional Biosolids Composting Facility in Vernon. That facility has lower modelled odour impact with no noise, dust or visual impact yet receives between 80 and 130 complaints per year (2014 – 2017) resulting in significant and costly mitigations imposed on the City by the Ministry of Environment;
5. Experience at other landfills that have allowed residential development too close has resulted in premature closure of those facilities. The Westside Landfill is a local, recent example. There are many other examples across North America.

The range of possible consequences of the nuisances are significant, both to City of Kelowna taxpayers as well as residents including:

1. Reduction or loss of the economic impact to the local economy of managing our own waste of over \$3 Billion over the remaining life of the landfill assuming that waste would need to leave the Region for disposal;
2. Significant impact of waste management costs to all regional citizens. If we assume a landfill closure as far away as 2063 and a modest \$20 per tonne cost increase to haul and dispose of waste elsewhere, the additional costs to regional citizens would be over \$400 million over the planned landfill life;
3. Unplanned early closure will cost in the tens of millions of dollars to cap and cover the landfill. These costs are currently expected to be funded as the landfill is filled. Early closure could result in inadequate funds being set aside by users on a pay as you go basis. The additional funds would be the responsibility of City of Kelowna taxpayers as landfill owners;
4. Ongoing environmental monitoring and maintenance costs which could range from \$100,000 to \$500,000 per year for up to 200 years, which is a closure requirement of the Ministry of Environment. Funding requirements and long term landfill liability rests with the City of Kelowna;
5. Mitigation costs to either move the compost facility or enclose it in warehouse style buildings estimated to range from \$28 to \$52 million to reduce odour, dust and noise from compost operations. It is unknown how effective these mitigation efforts would be, but they would not affect nuisance impacts generated from landfilling activities.

While processing this ASP, there have been various points where both staff and the applicant have reviewed opportunities to modify the development concept to address the interface incompatibilities with the Glenmore Landfill. Upon completion of the initial landfill nuisance assessment, there were revisions to the original development concept layout to remove development in high nuisance areas. However, a number of evolving factors continued to raise concerns as the file progressed, which included an updated landfill nuisance assessment and modelling analysis, preliminary preparation of a Permit application for the Regional Biosolids Compost Facility requiring Ministry approvals, and precedent of other facility closures within the region based on nuisance incompatibilities.

While the applicant team and Staff have explored some preliminary options to mitigate this interface incompatibility, it has been concluded that the City considers the risks too great to the landfill and compost operations to accommodate the proposed Area Structure Plan. It should be noted that the current land use pattern submission was completed in response to an earlier nuisance study and is consistent with the recommendations therein. However, given recent experiences and an updated nuisance report, the proposed ASP land use is no longer considered compatible with the recommendations. Accordingly, given the City's potential corporate and financial risks without substantial mitigating measures in place to 'safeguard' the Landfill operations, Staff are of the opinion that residential development as proposed is incompatible with adjacent land use and that the risks to residential quality of life and City operations are too great to allow the proposal to proceed as-is. As noted below, the City must balance the overarching community benefit with the pressures of a development proposal and evaluate the net gain to achieve the long-term community vision.

In conclusion, the processing of the Diamond Mountain ASP has been a long, complex exercise that Staff have endeavored to expedite while balancing the many technical aspects that an ASP requires. The overarching goal of an ASP exercise is to influence and guide a development proposal of this magnitude to have the highest degree of 'fit' with the surrounding community, meet the objectives of

the OCP growth strategy, and comprehensively plan to provide a quality of life for the future residents of the neighborhood. However, updated information regarding the potential landfill nuisance impacts leads to the conclusion that the interests of the community-at-large and of the potential future residents of Diamond Mountain would not be served by pursuing residential development on the site. The long-term operational functioning of the Glenmore Landfill and Glengrow compost facility is a vital community asset, and must be factored into consideration when considering this development proposal.

#### 4.1 Background

The 2030 Kelowna Official Community Plan identifies the Diamond Mountain site as an ASP area. On December 3, 2012, Council authorized commencement of the Diamond Mountain ASP in accordance with Council Policy No. 247. Council supported amendments to the ASP boundary and the proposed public consultation strategy on April 15, 2013.

Staff have worked with and provided direction to the applicant team through each step of the ASP process. Generally, an ASP is processed in the following sequences should it be favorably endorsed:



#### 4.2 Project Description

The entire Diamond Mountain ASP envisions approximately 1,000 residential units in a range of residential forms, including single detached, semi-detached, townhouses, low-rise apartments, stacked townhouses and apartments on a natural hillside. The higher density residential areas are located in the northern portion of the site where the topography and site conditions are more suited to development. A small neighbourhood commercial centre is adjacent to the multi-family areas to serve the day to day retail and service convenience needs of area residents. The buffer area immediately south of John Hindle Drive would remain agricultural and include a proposed private berry patch and community garden.



Figure 1 - Diamond Mountain Configuration

A total of 882 residential units would be anticipated in the initial development phases in a mix of densities and building forms in the S2RES – Single / Two Unit Residential, S2RESH – Single / Two Unit

Residential – Hillside, MRL – Multiple Unit Residential (Low Density), MRM – Multiple Unit Residential (Medium Density), and COMM – Commercial Future Land Use designations. The S2RES and S2RESH designations would account for approximately half of all units, with another 40% within the MRM designation. A breakdown of the initial proposed Future Land Use designations with the associated land area and estimated residential units is shown below.

Future Land Use Designation	Approximate Area (ha)	Estimated Units
REP – Resource Protection Area	4.37	n/a
S2RES – Single / Two Unit Residential	12.00	440
S2RESH – Single / Two Unit Residential – Hillside	9.59	
MRL – Multiple Unit Residential (Low Density)	4.75	77
MRM – Multiple Unit Residential (Medium Density)	3.19	350
COMM – Commercial	0.44	15
PARK – Major Park / Open Space (Public)	3.97	n/a
<b>Total</b>	<b>38.31</b>	<b>882</b>

OCP Objective 5.14 is to provide parks for a diversity of people and a variety of uses, and OCP Policy 7.12.2 outlines criteria for a city-wide network of natural area parks. The development area proposes three neighbourhood parks and a natural open space area under the PARK – Major Park / Open Space (Public) designation. The three neighbourhood parks would be located throughout the site, offering a range of passive recreational opportunities for area residents and visitors. The natural open space area covering the northwestern portion of the site has steeper forested slopes and is adjacent to agricultural land to the west.

#### 4.3 Site Context

The Diamond Mountain ASP area consists of four properties totalling 88.8 ha (219.4 ac) in Kelowna's McKinley City Sector. The site is southeast of the intersection of Glenmore Road and John Hindle Drive, with the Glenmore Landfill located to the north, Robert Lake to the east, open space and agricultural land to the south, and agricultural land and Wilden to the west. John Hindle Drive will provide a connection to the University of British Columbia's Okanagan Campus (UBCO) approximately 2 km to the east. As a whole, Diamond Mountain is considered a hillside development, with topography ranging from gently sloping hillsides and benches to steep slopes and peaks.

The entire site is currently zoned A1 – Agriculture 1 and is undeveloped with the exception of four single family homes and several outbuildings. The northern portion of the site has been used for cattle grazing and a small sawmill operation. The site is outside of the Agricultural Land Reserve (ALR); however, it is surrounded by ALR land to the north, east and west.

Adjacent land uses are as follows:

Orientation	Zoning	Land Use
North	A1 – Agriculture 1	City of Kelowna Glenmore Landfill
East	A1 – Agriculture 1	Agriculture Robert Lake
South	A1 – Agriculture 1	Natural open space Agriculture Single dwelling housing
West	A1 – Agriculture 1 RR1 – Rural Residential 1 RM3 – Low Density Multiple Housing	Agriculture Single dwelling housing Multiple dwelling housing (Yaletown condos)

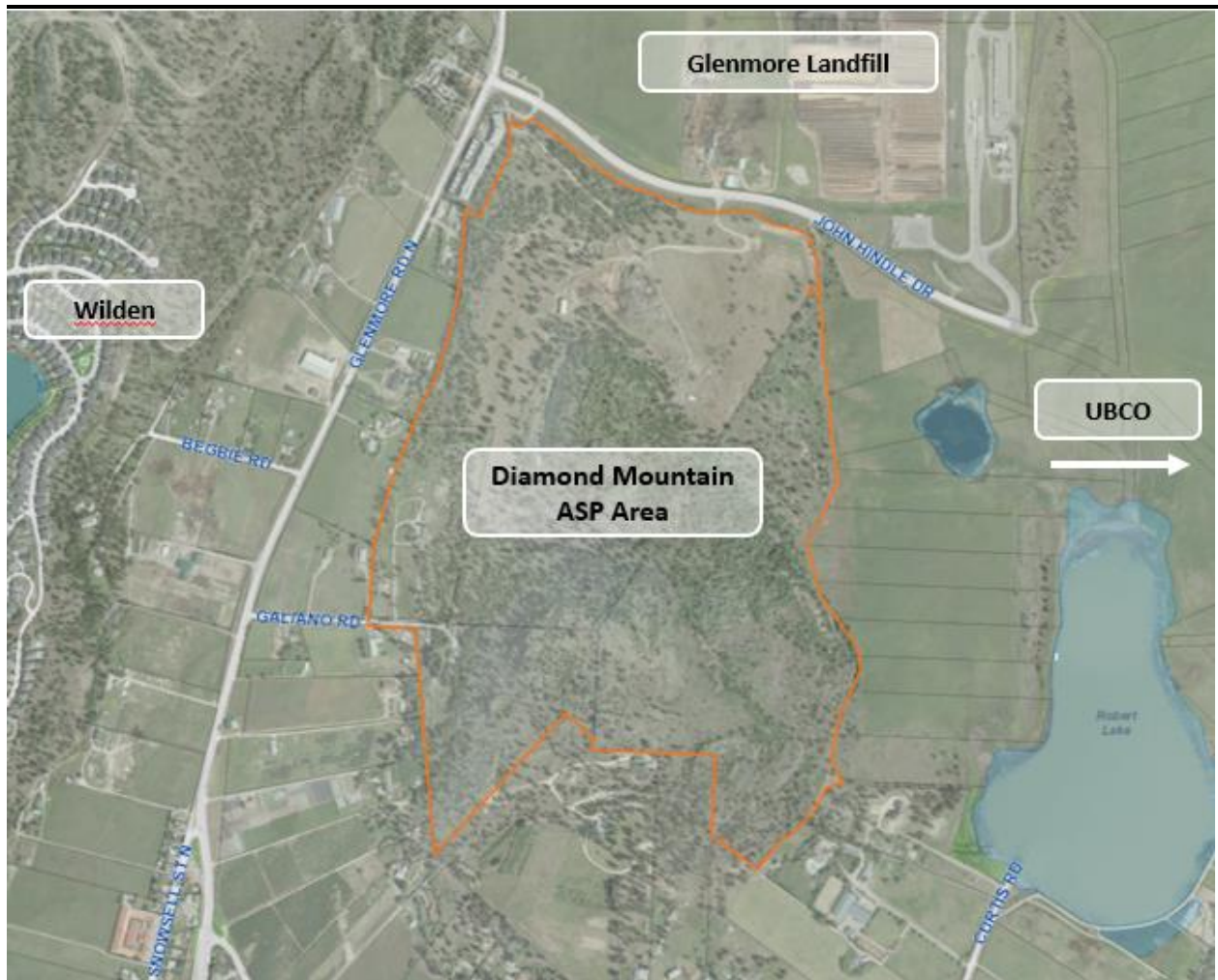


Figure 2 Subject Property Map

#### 4.4 Detailed Application Chronology and Process Challenges

In 2008, the City entertained discussions with the applicant regarding the provision of the subject lands being included in the next OCP update to be designated as an Area Structure Plan. These parcels had not been previously considered as an area to target additional residential units, but after extensive discussions and Council endorsement, it was approved to be included in the latest OCP update (adopted in 2011). At this time the compost facility was located in its current location, and the planned landfill footprint was essentially the same as it is today.

The Diamond Mountain ASP was first initiated in late 2012. Council gave approval to start the ASP and the process began in earnest early in 2013. This officially opened the door to exploring whether, to what extent, and in what form development would be appropriate on the site. No development rights are granted through an ASP. Rather, it is an exploratory process where the results are intended to be incorporated into the OCP.

While the applicant in this case started with a fully-formed concept and detailed plans, the ASP process asks participants to begin with a blank slate and to work jointly to arrive at an appropriate development concept.

### **ASP Phase 1 – Early 2013 to Summer, 2014**

The role of the first phase of the process is to determine the major constraints and conditions that will determine what land is developable and what form of development might be most appropriate. Items such as environmental sensitivity, geotechnical conditions, surrounding development, and heritage features are all examined in this phase.

Initially, the process moved as expected. The first set of challenges arose on the subject of landfill nuisance. The subject had been flagged very generally at first, but more significant concerns were raised later in 2013 and a full analysis was undertaken to understand the risks and options more completely. Considerable work with the applicant, 3<sup>rd</sup> party engineers, City staff and Council resulted in a proposed nuisance buffer.

Initial public engagement was hosted by the applicant team in the Spring of 2014, and received modest attendance. Approval was then given to begin the next phase of ASP work where the development concept would be created.

### **ASP Phase 2 – Fall 2014 to Fall, 2016**

The second phase of an ASP is meant to build on the results of the first phase. Where the first phase identifies key constraints and context, the second phase begins the detailed planning of the development. This involves items like land use, road network, utilities, parks, amenities, and phasing.

Early in Phase 2, work on the transportation network began, examining the transportation needs generated by the development, both internal to the project, and on the broader City network. This resulted in a number of iterations of Transportation Impact Analyses (TIA) and lengthy discussions to arrive at a final decision. The applicant team took the final decision regarding transportation forward and incorporated it into their plans.

A first draft of the complete ASP was submitted in April of 2016 and a second and final open house was hosted by the applicant team in June. During review of the ASP, further discussions and negotiations were needed to arrive at a suitable parks plan. This issue was resolved, and staff prepared to move forward to Council.

In the final circulation of the ASP in late 2016, further concerns were raised regarding the landfill operation and nuisance impacts on the proposed development area. The process of completing an updated Landfill Fill Plan, including public engagement on the plan, highlighted that the original analysis and solution were inadequate and would put the landfill and compost operations in jeopardy. Further study was conducted and reviewed by the applicant and their staff.

Since the additional nuisance impact concerns were identified, staff and the applicant team have been working to try to find a solution. The processing of this application has incurred a significant amount of complexity, and corresponding processing challenges. Staff from many areas of the corporation aim to be transparent and open to acknowledge that this application has had processing issues which include:

- The initial nuisance technical report was limited in scope, and was inadequate to interpret the spectrum of both current and future community and financial risks;

- Staff turnover which has not resulted in seamless continuity in representing departmental interests;
- Continued planning for the Glenmore Landfill Fill Plan during active processing of this ASP development file.

While Staff endeavor to process each application with consistent and predictable process, the timeline and technical complexities of this file have been a notable procedural challenge. The Glenmore Landfill is one of the City's largest, most valuable and critically important pieces of infrastructure, warranting the detailed review.

## **4.5 Risk Analysis**

During Phase 1 of this application review, Staff raised a significant concern about the potential for nuisance impacts from the regular operation of the Glenmore Landfill on future residents of Diamond Mountain. The City's concerns were two-fold: first, as a fundamental matter of good planning, staff do not wish to place future residents in areas where their quality of life will be impeded; second, there is a liability risk to the City that future residents affected by nuisance could take action against the City, potentially limiting the operation of the Glenmore Landfill and/or compost facility. The challenge at this point was that the City did not have good quality data identifying nuisance generated from the Glenmore Landfill and compost facility beyond anecdotal evidence from complaints and staff experience.

Risk Analysis considers two perspectives: the first is the likelihood or probability of a risk occurring and, the second is the possible range of consequences. Through 2016 much of the staff and developer focus had been on the risk of nuisance and the possible consequences on the development. This risk analysis expands the consequences to include the possible impact of the proposed development on the Kelowna landfill, the City of Kelowna, and citizens of the Regional District of Central Okanagan.

### **4.5.1 Risk Probability**

The identification of risk factors and their probability for this development proposal come from a combination of a review of regulatory guidelines, nuisance modelling and professional experience, including advice from landfill and nuisance experts, as well as the City's and Region's experience with nuisance.

#### *4.5.1.1. Regulatory and Ministry of Environment Indicators*

The landfill and compost facility generate nuisances such as noise, odour, dust, vectors (birds) and visual nuisance including light pollution. To help minimize the impact of these nuisances and inform decisions around locating such facilities the Ministry of Environment develops regulations and guidelines to help minimize negative impacts on people and communities. The following two Provincial documents are important to the discussion at hand:

1. Landfill Criteria for Municipal Solid Waste, June 2016. This document is an update to the previous version published in 1993. The most significant change relating to this discussion is an increase of the minimum buffer zone to 500 metres (from 300 metres) between the base of landfilling to "sensitive land use", either planned or existing. A graphic of the 500 metre buffer zone from the approved fill plan is provided as Figure 3



2. Compost Facility Requirements Guideline: How to Comply with Part 5 of the Organic Matter Recycling Regulation, March 2004. Table 4.1 of the Guideline recommends the minimum buffer zone distance from a composting site to residential area be 400 to 1,000 metres. A graphic showing the recommended minimum 400 to 1,000 metre buffer limits is provided as Figure 4. This figure clearly shows much of the proposed residential development is within 400 metres of the existing compost facility and most of the development lands are within 1,000 metres of the existing compost facility.

The Guideline also states "*it is often favorable to select a site that is not visible to neighbours...*" (page 4-3). Given the nature of the hillside development it will not be practical, perhaps not even possible, to screen either the landfill or compost facilities from the proposed development.

The regulatory guidelines suggest that there is a high risk of nuisance impact from the compost facility and, perhaps to a lesser degree the landfill depending on site lines and other environmental concerns (topography, wind, specific site activities, etc).

The Ministry of Environment can determine if a facility is "polluting" via nuisance such as odour, dust, noise, and can impose significant consequences on the City of Kelowna. The determination of "pollution" can be made based, in part, on nuisance and impact complaints received by the Ministry. In response to their recent review of the 2014 Nuisance Impact Study Ministry staff stated the following:

*"Under the authority of the Operational Certificate and the Environmental Management Act, the City of Kelowna may be required to take actions to prevent unacceptable impacts if the Director is satisfied the landfill operation is resulting in pollution. This could mean for example, relocating the fill boundary of the landfill to distance the principal source of odour. An alternative to limiting the operation of the landfill may be to purchase the properties where the land use conflict is not otherwise feasible to resolve. Given the study results, Kelowna should consider this opportunity to prevent potential development impeding the operation of the landfill and significantly increasing costs".*

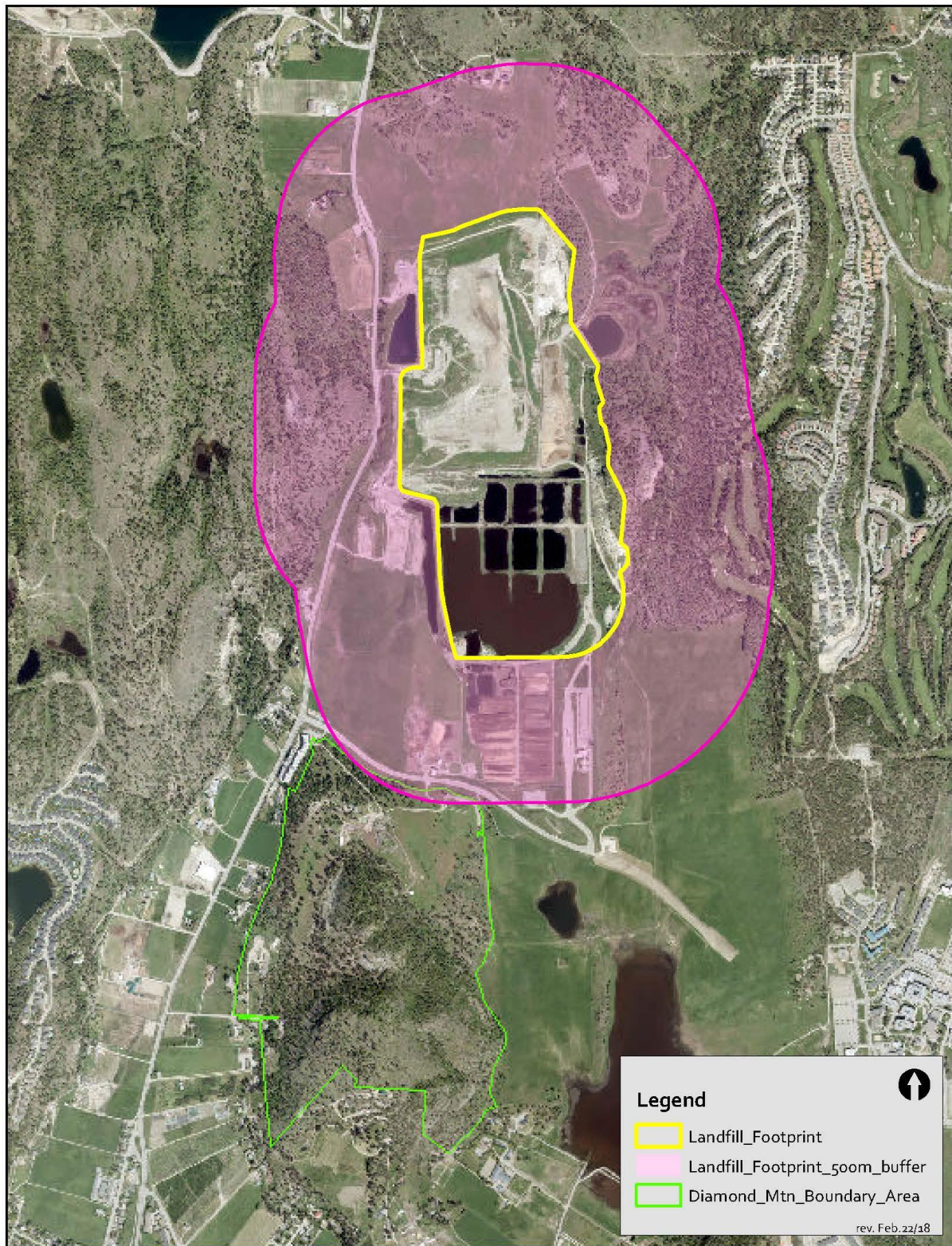


Figure 3 - Regulated landfill buffer zone



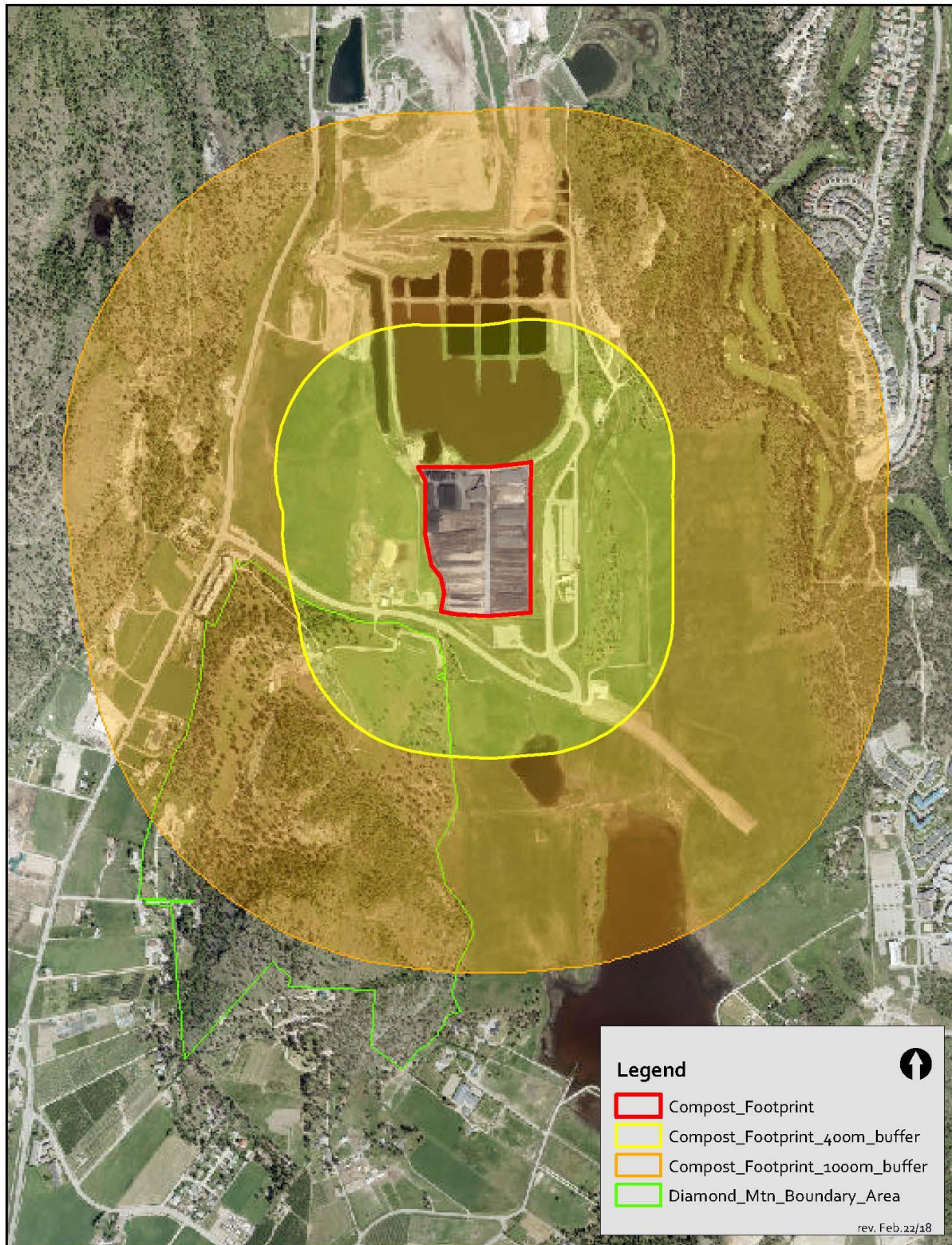


Figure 4 - Minimum Recommended Buffer Zones from Compost Facilities

#### 4.5.1.2. Nuisance modelling and Consultant Recommendations

To help identify and quantify potential nuisance risks, the City hired Conestoga Rovers & Associates (now GHD Consulting) in 2014 to identify and model noise, odour, dust and light risks on the proposed development from the landfill and compost operations. The scope of the study did not include a visual risk assessment (outside of light) although visual impact of landfills is a known significant nuisance risk.

During further analysis of the Landfill Nuisance Study impacts (spring 2017), staff identified that the 2014 nuisance impact study was insufficient to help the understanding the potential nuisance risks for the following reasons:

1. It modelled nuisance impacts based on the existing (2014) configuration of the landfill and compost operations. It did not reflect planned and known relocation of significant nuisance generating operations from the northeast corner of the site to the area operated by compost operations. These relocations were identified in the 2008 Comprehensive Site Development Plan but unfortunately were not included in the 2014 nuisance model.
2. It did not consider growth in landfill or compost operations. Disposal rates in 2014 were approximately 125,000 tonnes per year which is represented in the model. The Fill Plan at that time anticipated a final disposal rate at closure of approximately 400,000 tonnes per year. In comparison, the new fill plan expects to see a disposal rate of up to 600,000 tonnes per year near the time of landfill closure. As the proposed development and the landfill would co-exist for at least 50 years the modelling needed to incorporate a future nuisance scenario based on expected future operations.

As a result, GHD was tasked with updating the 2014 analysis reflecting the imminent relocation of organic and inorganic processing to the southern section of the property and modelling two time-period scenarios; 2017 and 2067 with a corresponding increase in disposal and compost rates. The result is the report "Assessment of Potential Nuisance Levels of Noise, Odour, Dust, Light and Litter" report by GHD (May 11, 2017).

Completed by qualified engineers in accordance with industry best practices the report clearly identifies that there are projected to be significant nuisance impacts on the lands around the Glenmore Landfill, particularly those located to the south. Currently, these lands present a limited risk to the City, as the lands are principally agricultural in nature and not defined as "sensitive" under Provincial regulations or siting guidelines. Agricultural land use is generally compatible with landfill and compost operations. However, some of the lands impacted are within the Diamond Mountain ASP area as well as other ASP areas defined in the OCP.

Based on their overall expertise in solid waste management as well as nuisance management related to solid waste facilities, GHD was asked to provide a Professional Opinion on the potential impact on both the development and the City of Kelowna landfill and compost operations. Some relevant quotes that summarize the risk of each of the nuisances modelled are below:

- i) Odour  
*"From a nuisance risk perspective, any developments within the exclusion zones ... have the potential to be negatively impacted by odour. There would be a risk of increased complaints. In addition, potential legal action for loss of enjoyment may occur which may*

*lead to capital expenditures required to reduce odour impacts. From a regulatory risk perspective, depending on how the BC government implements future odour compliance regulations, the operations at the facility could be greatly impacted."*

ii) Dust

*"Similar to odour, the model shows locations that may be less impacted (i.e. Diamond Mountain Development) however, for conservatism, the mountain to the south was included in the exclusion zone analysis. From a nuisance risk perspective, any developments within the exclusion zones ... have the potential to be negatively impacted by dust. There would be a risk of increased complaints due to dust settling on vehicles, outdoor furniture, windows etc. There may also be a nuisance risk for the potential reduced visibility."*

iii) Noise

*"There are currently no noise level limits set out by the British Columbia Ministry of Environment or the City of Kelowna's Noise Bylaw. The noise guideline criteria in Ontario are 45 dBA at night and 50 dBA during the day for urban land uses. This is consistent with most jurisdictions that have published noise bylaws, in addition, these levels are typical of background noise levels in an urbanized community.*

*...From a nuisance risk perspective, any developments within the exclusion zones... have the potential to be negatively impacted by noise. There would be a risk of increased complaints. In addition, potential legal action for loss of enjoyment may occur which may lead to capital expenditures required to reduce noise impacts.*

*From a regulatory risk perspective, depending on how the BC government or the City implements future noise compliance regulations, the operations at the facility could be greatly impacted. Should the 50 dBA day time limit be implemented in BC, mitigation would be required for any developments within the exclusion zone; this would include parts of the Diamond Mountain development.*

*Noise mitigation could be implemented at the receptor and be the responsibility of Diamond Mountain. This could require the use of noise barrier walls around the north and east extent of the development. Mitigation by the receptor is a typical practice that is planned through the land-use development process."*

The referenced Noise Exclusion Zone is shown below as Figure 5.

iv) GHD Conclusions

*"Based on GHD's review of the potential impacts, a residential development immediately south of Glenmore (landfill) is not advisable due to the nuisance and regulatory risks. Although there may be boundaries where the risks are modelled to be less, residents would need to travel through higher impacted zones to gain access, therefore it would not be prudent to develop the proposed Diamond Mountain residential development."*



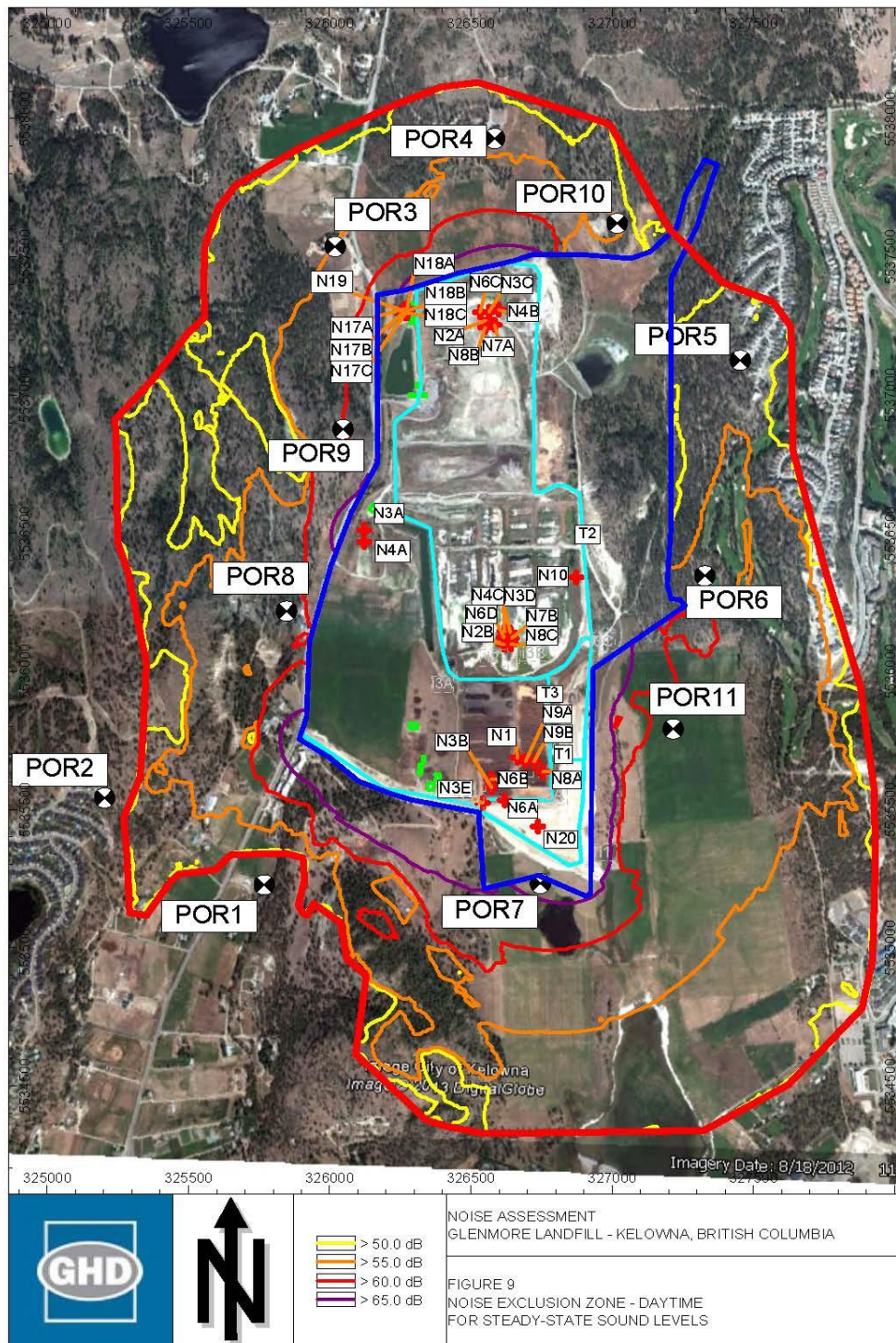


Figure 5 GHD Report Noise Exclusion Zone

It is worth noting that the modelling studies often take a conservative approach to the input parameters. This is a normal modelling practice, especially if the potential consequences are significant, and tries to account for the items that were not anticipated or unintentionally left out of the model. Staff have identified the following nuisance impacts that are considered as part of staff conclusions and recommendations in addition to the specific model results:

1. The modelling exercise includes only nuisances generated from the landfill property itself. Noise, dust and odour from all of the landfill traffic on John Hindle Drive, which will be associated with the landfill by impacted residents, is expected to be significant. Landfill traffic has been a source of complaint in Kelowna and elsewhere. The landfill currently sees between 300 and 1,500 vehicles per day, depending on the season. Unless a waste transfer facility is built in the region to replace many smaller vehicles with large ones the growth rate in traffic is expected to be similar to the growth rate in waste managed (about 400 percent between now and closure);
2. The modelling for odour does not include the impact on temperature inversions, which lock air in the valley bottom and occur a few times per year. During these events, it is acknowledged that the Landfill operations can be smelled/detected far south of the site along Glenmore Road. Temperature inversions will likely increase the frequency and intensity of odour;
3. As the landfill grows higher there may be an increase in landfill noise heard by higher elevation residential properties on the proposed development. This may or may not result in a movement of the recommended development exclusion zone;
4. The modelling does not take into account the visual impacts (nuisance) of the facilities. Seeing the facilities daily, whether while commuting or directly from residences, can compound the impact of other nuisances. This is relevant as the landfill will change over time. What may seem to be a minor visual nuisance now, while landfilling is at the north end of the site, will be a more significant nuisance when landfilling reaches the south end of the fill area.
5. While the modelling takes into account growth in operations (quantity of nuisance) it does not take into account operating hours. Currently the landfill operates 7 days per week, 7:30 am to 4:45 pm. As the landfill disposal rate grows there will be pressure to extend the operating hours. It is foreseeable that the operating hours will be increased to 7 am – 7 pm, or perhaps 8 pm, as many larger landfills have seen the need to do. This will extend the period of nuisance generation, especially noise, into the early evening hours when more people are home. Should the city choose to not extend the hours, due to noise concerns, the resulting impact would likely require more equipment during the current hours, thereby increasing daytime noise.

For these reasons, model results cannot be looked at in isolation, and only form part of the evidence of nuisance that must be considered.

#### *4.5.1.3. City of Kelowna experience with Nuisance*

The City of Kelowna has significant experience in both generating nuisance and the resulting consequences. In 2012, the City spent a total of \$8 million acquiring properties to the north of the landfill. This ensured that the City owned the buffer zone at the north end of the landfill to address nuisance impacts on those lands and allow the landfill to continue to fill to the existing property line. In the 1990's the City acquired lands on the west side of Glenmore road at a total cost of \$1.3 million for similar purposes, as well as to expand Coyote Ridge Park. The lands in questions are all within the landfill buffer zone as defined in Provincial guidelines.

Over the period 2006-2010 the City received an average of 2 complaints per year regarding odour at the wastewater treatment plant. The 2010 plant upgrade included \$5 million in odour management works. Complaints now average 0.5 per year. This work was not provincially mandated but a decision of Council demonstrating the political willingness to spend significant funds to address nuisance if the nuisance can be addressed.

The City operates a Biosolids Composting Facility in partnership with the City of Vernon. Both cities, and the Ministry of Environment, receive nuisance complaints (80 per year in 2016 and 2017, higher in earlier years) from a handful of properties. These properties are approximately 1 kilometer away from the site. There is no visual, dust or noise impact from our operation on the reporting properties, only occasional odour. However, the resulting impact has been that the Ministry of Environment has mandated additional odour management mitigation which comes at a significant cost to the cities. Past experience demonstrates that the Ministry of Environment will not hesitate to require mitigation works with little consideration of the cost impact on our operations.

City experience with complaints from existing residents confirms the modelling. We receive some noise complaints from Quail Ridge residents. The modelling shows a lower noise impact to Quail Ridge than the proposed development site. During the Public Engagement around the landfill Fill Plan in early 2017, the City received comments from Quail Ridge residents that were thankful that the inorganic processing activities would move to the south as this would reduce the noise impact of our operations on their properties. We also received a letter from a resident at the corner of Glenmore Road and John Hindle Drive confirming that the nuisances are real.

#### *4.5.1.4. Experience from the RDCO*

*"The Westside Landfill located off Asquith Road in West Kelowna is closed and stopped receiving waste materials in mid-2010, earlier than anticipated before reaching its full design capacity, in part in response to existing and developing nearby residential neighbourhoods" (RDCO website).*

RDCO staff have highlighted the impact of adjacent residences on the Westside Landfill. Residents were "... successful at getting the landfill closed before it reached capacity...". It has been concluded that the landfill closure was based on pressure by residents to the local government councillors (District of West Kelowna Councillors and the RDCO Board). Residential development was permitted within a few hundred metres of the landfill and complaints were based on noise, odour, dust and issues related to vector attraction (e.g. birds, etc.). Given this precedent, it serves to act as a caution that residential influence to prematurely close a landfill at the local decision making level can be significant.

There is substantial evidence from Provincial Regulations and Guidelines, recent nuisance modelling efforts, City of Kelowna, Regional and Professional experience with nuisance that indicates that the likelihood of significant nuisance complaints, political pressure on future Councils, MLA's and the Ministry of Environment with residential development on much of the lands proposed for development is inevitable. The facilities will generate nuisances. The extent and frequency of the nuisances will rise with the growth in the landfill and the pressure to act will increase substantially as more people are impacted. It is difficult to appreciate the impact of nuisance now, as the landfill is relatively small and work is at the north end of the site. Purchasers in 5 to 10 years will not be able to adequately envision the final levels of nuisance from the landfill as disposal moves closer and closer to their properties.



## 4.5.2 Consequences of Risk items

### 4.5.2.1. Consequences to Kelowna and Regional Citizens

With recent approval of the new Fill Plan, the Glenmore landfill has a remaining capacity of approximately 32 Million tonnes. If we assume a tipping fee of \$100 per tonne (2020 rate) the economic impact of the landfill activities in “today’s” dollars exceeds \$3 Billion over the life of the landfill. This should not be considered revenue for City of Kelowna, but represents the necessary community expenses of managing our waste over the life of the landfill. The value of having the Region’s landfill includes:

1. The necessary expense of waste management and \$3 billion economic activity remains within the region, supporting jobs and local business;
2. In addition to disposal of garbage, the landfill provides a convenient and important outlet for excavated soil, necessary to support cost effective construction and development;
3. The landfill provides local inorganic processing and recycling for products such as broken concrete, asphalt, clean wood waste, etc. at a convenient and cost effective location for citizens of the region.

Each of the above activities generate nuisance and are part of the overall nuisances impacting the proposed development site.

Early closure of the landfill would have a very significant financial impact on the community at large. This would include:

1. A loss of local economic activity should the City/region need to ship waste outside of the region as the economic activity would move to another community. It is unlikely that a replacement landfill or waste to energy facility would be located within the RDCO. Nobody wants such facilities in their neighbourhoods due to the nuisance impacts. Depending on how much space remains in the landfill, the local economic loss could range up to \$3 billion. Even a closure 45 years from now would mean approximately \$2 billion in lost local economic activity as the remaining landfill volume is projected to be about 20 million tonnes in 2063.
2. As a result of early closure, waste management costs would rise significantly to pay for the transfer and hauling of garbage to a facility outside of the Region. If we assume a 2063 closure and modest \$20 per tonne cost increase with 20 million tonnes of airspace remaining, this would result in an additional expense to citizens of the Region of \$400 million for waste management over the remaining planned landfill life (or \$12.5 million per year on average).

The economic cost to the other aspects of the economy, such as the cost of disposing of excavation material, or the additional costs of managing used asphalt and concrete is not included in the above analysis and would add to the economic impact.

### 4.5.2.2. Consequences to City of Kelowna

Early closure of the landfill also carries with it significant financial risk to the City of Kelowna. The City is responsible for landfill closure, which means an impermeable cover placed over the landfill, as well as the long-term management of the gas collection system, leachate management system, and mitigation of any potential issues. The current plan is to progressively close the landfill as it is filled

using operating revenues. Some funds will be set aside for final closure and to act as a sinking fund for annual operating and maintenance costs of the closed landfill.

Early landfill closure could mean that the necessary funds to cap and manage long term operations have not been set aside, exposing City of Kelowna taxpayers to significant liability. Overall landfill closure costs are likely to be in the range of \$30 to \$50 million based on estimated closure costs for another landfill in the Province. Council will receive an update and detailed cost estimate on this liability when staff report back on the Design, Operating and Closure Plan work currently underway.

In addition to the cost of closing the landfill, the Provincial Landfill Criteria for Municipal Solid Waste (S. 8.3) requires post closure monitoring and maintenance of a facility the size of Glenmore Landfill to occur for 200 years unless determined otherwise based on a risk assessment. Post closure activities include environmental monitoring, site maintenance, leachate pumping and management, site repair / restoration, landfill gas monitoring and management. These costs are being worked on as part of the Design, Operating and Closure Plan report, but are likely to be between \$100,000 and \$500,000 per year for up to 200 years. To ensure intergenerational equity, the costs of this long-term landfill maintenance should be borne by the current users of the landfill and not future taxpayers. Therefore, a substantial reserve should be created from landfill revenues to fund the ongoing liability. The amount will be presented to Council as part of the Design, Operating and Closure Plan work currently underway. However, we can expect this requirement to be in the tens of millions of dollars. For comparison purposes the Regional District of Nanaimo requirement has been set at \$27 million for a landfill 1/7<sup>th</sup> the Size of Kelowna's (ultimate fill volume).

The Glengrow compost process and storing of finished compost at the landfill site is a very significant source of the identified modelled nuisances. It is currently a \$2 million per year operation. Unlike the landfill operation, most of the nuisances (noise and dust) generated by our compost operations could be mitigated by enclosing some or all of the operations indoors. Furthermore, a bio filter could be installed to reduce odours from the indoor facilities. Depending on the amount of the operation to move indoors in large warehouse style facilities, the cost of the mitigation has been estimated to range from \$28 to \$52 million. This is in addition to the planned \$22 million investment in an aerated static pile composting system (similar to the system at the Regional Biosolids Compost Facility) for yard waste composting. It should be noted that mitigation may not be significant enough to eliminate complaints from the facility.

The other option would be to relocate the compost operations. Like the community impact on relocating the landfill, the additional cost of transporting yard waste to the new facility and transport compost to market, would be funded by yard waste composting users. The cost of finding and building a new site must also be considered and has not been estimated.

In summary, the potential financial impact of approving this ASP to the City of Kelowna and to the community at large is extremely high. The direct cost to Kelowna taxpayers could range from \$28 to \$52 million to mitigate nuisance generated from compost impacts, to many tens of millions of dollars to close and manage the landfill should it be closed sooner than planned. This does not reflect the potential increased disposal costs to residents and businesses of the region that could easily amount to hundreds of millions over the planned landfill life. The economic impact to the community of early landfill closure and relocating disposal operations outside of the region could easily be in the billions of dollars.

## 4.6 Conclusion

In summary, the Diamond Mountain Area Structure Plan process has endeavored to explore the development feasibility of the subject parcels and determine their best use as they relate to the overarching City's growth strategy. Through this review, the completion of multiple nuisance technical reports, and recent city experience in managing the impact of nuisance at other facilities, it is apparent that the proximity of the subject parcels to the Glenmore Landfill will impose risk to the City and to the community primarily in the form of noise, odour and dust nuisances to future residents and the consequences of those risks can be extremely high. While ideally this conclusion would have been arrived at much earlier in the process, it is the corporate position that development in this form at this location is not in the community's best interest and will impose a significant risk to the Glenmore Landfill.

For the reasons noted above, pursuing development in the form that this ASP proposes is not in the long-term public interest, and therefore the corresponding OCP application and zoning amendments are not supported. Ensuring that a high quality of life for future residents is achievable is a paramount planning objective. Of equal importance is balancing the long-term asset life of the Glenmore Landfill and its critical role that serves citizens of the region. On balance, the risks of interface incompatibility and future mitigation measures outweigh the benefits of accommodating residential units on these parcels and therefore the residential development form is unsupportable.

## 5.0 Current Development Policies

### Development Process

Development must comply with City bylaws and policies, including, but not limited to: Kelowna 2030 – Official Community Plan Bylaw No. 10500, Subdivision, Development & Servicing Bylaw No. 7900 and Zoning Bylaw No. 8000, as amended or replaced. During the ASP process, City staff identified several matters that need further consideration to ensure City policies and bylaws are met. These include drainage, storm water, utilities, transportation, and parks. The applicant is aware of these matters and has chosen to address them at time of rezoning and subdivision, if the application were to proceed to the next stage.

### 5.1 Kelowna Official Community Plan (OCP)

The subject properties are designated in the Official Community Plan (OCP) for the preparation of an Area Structure Plan. Chapter 3 of the OCP goes further to anticipate the type and density of development on the site, which is linked to the City's 20 Year Servicing Plan. Pending the outcome of this ASP application, an update to the current OCP would examine the subject parcels future land use given the updated technical nuisance analysis as it relates to land use compatibility.

#### **To ensure the long-term viability of local landfills, including the Glenmore Landfill<sup>1</sup>.**

As has been demonstrated from the nuisance study as described in this report, significant residential development close to the City's landfill places a high risk on the long-term viability of the Glenmore Landfill and Glengrow compost operation.

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<sup>1</sup> City of Kelowna Official Community Plan, Chapter 7 (Infrastructure), Objective 7.25.

**Provide parks for a diversity of people and a variety of uses<sup>2</sup>.**

**Ensure environmentally sustainable development<sup>3</sup>.**

**Environmentally Sensitive Area Linkages.** Ensure that development activity does not compromise the ecological function of environmentally sensitive areas and maintains the integrity of plant and wildlife corridors<sup>4</sup>.

**Steep Slopes.** Prohibit development on steep slopes (+30% or greater for a minimum distance of 10 metres) except where provided for in ASPs adopted or subdivisions approved prior to adoption of OCP Bylaw 10500<sup>5</sup>.

**Access Through Steep Slopes.** Discourage roads (public or private) through +30% slope areas intended to access lands beyond, except in cases where it can be demonstrated the road will be sensitively integrated (visual and aesthetic impacts minimized) with the natural environment and will present no hazards to persons or property, environmental threats or unreasonable servicing or maintenance challenges<sup>6</sup>.

**Ensure development is compatible with surrounding land uses<sup>7</sup>.**

As has been demonstrated from the nuisance study as described in this report, significant residential development close to the landfill and compost facility is not compatible with surrounding land uses.

**Ensure context sensitive housing development<sup>8</sup>.**

**Cluster Housing<sup>9</sup>.** Require new residential development to be in the form of cluster housing on / or near environmentally sensitive areas and areas of steeper slopes to lessen site disturbance and environmental impact on those areas identified on the Future Land Use Map 4.1 as single/two-unit residential hillside. Steeply sloped areas should be retained as natural open space, public or private. The intent of the clustering would be to preserve features identified through the Development Permit process that otherwise might be developed and to maximize open space in order to:

- a. Protect environmentally sensitive areas of a development site and preserve them on a permanent basis utilizing the most appropriate tools available;
- b. Facilitate creative and flexible site design that is sensitive to the land's natural features and adaptive to the natural topography;
- c. Decrease or minimize non-point source (i.e. asphalt roofs, driveways and parking) pollution impacts by reducing the amount of impervious surfaces in site development;
- d. Promote overall cost savings on infrastructure installation and maintenance; and

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<sup>2</sup> City of Kelowna Official Community Plan, Objective 5.14 (Development Process Chapter).

<sup>3</sup> City of Kelowna Official Community Plan, Objective 5.15 (Development Process Chapter).

<sup>4</sup> City of Kelowna Official Community Plan, Policy 5.15.3 (Development Process Chapter).

<sup>5</sup> City of Kelowna Official Community Plan, Policy 5.15.12 (Development Process Chapter).

<sup>6</sup> City of Kelowna Official Community Plan, Policy 5.15.13 (Development Process Chapter).

<sup>7</sup> City of Kelowna Official Community Plan, Objective 5.19 (Development Process Chapter).

<sup>8</sup> City of Kelowna Official Community Plan, Objective 5.22 (Development Process Chapter).

<sup>9</sup> City of Kelowna Official Community Plan, Policy 5.22.1 (Development Process Chapter).

e. Provide opportunities for social interaction, walking and hiking in open space areas.

## **6.o Application Chronology**

ASP Application – November 8, 2012

ASP Authorization by Council – December 3, 2012

ASP TOR issued by City Staff– December 21, 2012

Landfill Nuisance issue identified by City Staff – April 26, 2013

Nuisance Study Analysis by Consultant– August, 2013 – February, 2014

Peer Review of Nuisance Study (requested by Troika) – May, 2014 – June 16, 2014

Phase 1 ASP Report Submitted by Troika – July 31, 2014

Initial TIA submitted – June 2, 2015

TIA approved – March 1, 2016

Draft Phase 2 report submitted for review – April 15, 2016

Open House 2 – June 2, 2016

Phase 2 report re-submitted – November, 2016

OCP Amendment Application and Final ASP submission – February/March, 2017

Landfill Nuisance issue re-identified – February 22, 2017

Meetings with applicant team – May, 2017 – February 2018

## **Financial/Budgetary Considerations:**

As noted above, should the development proceed, there may be financial impacts to the Glenmore Landfill operational plan that would require extensive mitigation strategies to be employed. This range in costs is too diverse for Staff to quantify at this time.

Submitted by:

D. Noble-Brandt, Dept. Manager, Policy & Planning  
J. Moore, Long Range Planning Manager

K. Van Vliet, Utility Services Manager

**Approved for inclusion:**



Doug Gilchrist, Divisional Director, CP & SI  
Joe Creron, Deputy City Manager

Attachments:

Attachment A: Proposed Land Use Development Concept

Attachment B: Map of Potential Nuisance Levels of Odour, Dust, Noise, Light & Litter Reports, by GHD  
(May, 2017)

cc:

Divisional Director of Infrastructure

Divisional Director of Financial Services

Utility Services Manager

Department Manager of Community Planning

Solid Waste Supervisor