Market Analysis:
The Impact of Quarries on Housing Prices, Halifax, N.S.
MARKET ANALYSIS

THE IMPACT OF QUARRIES ON HOUSING PRICES

PREPARED FOR
SCOTIAN MATERIALS LIMITED

AS OF
JANUARY 2015

BY
ALEXANDRA BAIRD ALLEN

TURNER DRAKE & PARTNERS LTD.
HALIFAX - NOVA SCOTIA
27 February 2015

Mr. Jeff Pierce
Project Coordinator
Scotian Materials Limited
100 Venture Run, Suite 103
Dartmouth NS B3B 0H9

Dear Mr. Pierce:

Re: Market Analysis of the Impact of Quarries on Housing Prices, Halifax, NS

In accordance with your request of the 5th January 2015, we have completed a Market Analysis of the above location.

This study is intended to be used for analysis purposes and only by Scotian Materials Limited. Use of the report for other purposes or by other parties may invalidate the conclusions.

Scope of Work

(i) Property identification – we took as our source our CompuVal® Residential Database, which contains details of residential sales transactions conducted via the MLS® system, located within Halifax regional Municipality.

(ii) Property classification – we classified the properties according to their location relative to quarries in the area, using as our source the shapefiles of quarry locations provided by the client buffered in incremental radii (1 to 5 kilometres/not within 5 kilometres).

(iii) Data research – we conducted a literature search for studies undertaken in other regions with regard to the impact of quarries on housing prices.

Quality Standards

Turner Drake’s quality assurance system, which covers the conduct of all our operations, is registered to the ISO 9001:2008 standard. This assignment has been conducted in accordance with our quality assurance system.

Conclusion

We found no market evidence to suggest a pattern of negative impact on residential house prices or pricing trends due to the proximity of a quarry.

Yours truly,

ALEXANDRA BAIRD ALLEN
Senior Manager
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LIMITING CONDITIONS AND ASSUMPTIONS

(1) No responsibility is assumed for matters of a legal nature, nor do we render any opinion as to the title which is assumed to be good. Unless otherwise noted in this report, existing mortgages, liens, encumbrances and special assessments, if any, have been disregarded and the properties have been considered as though free and clear.

(2) We have not undertaken a survey of the properties, and no responsibility can be accepted for the accuracy of the Satellite Images. They are only included to assist the reader in better visualising the properties.

(3) Market conditions can, and do, change rapidly because of economic, social and political reasons. The market indicators pertain only to the dates indicated and no responsibility is assumed for changes which may have occurred since that time.

(4) This report must be used in its entirety since parts taken out of context may be misleading. The report, or any parts thereof, may not be used for any purpose other than that for which it was undertaken and is furnished for the exclusive use of the client. All liability to any party other than the client is hereby denied.

(5) Information in this report furnished by others is believed to be reliable, although no responsibility is assumed for its accuracy.

(6) Turner Drake & Partners Ltd. retain the copyright to this report. Reproduction in whole or in part is prohibited without their written permission and is a contravention of the Copyright Act.
### PURPOSE OF MARKET ANALYSIS

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PURPOSE OF MARKET ANALYSIS</td>
<td>To analyse the difference, if any, in housing price trends for areas near quarries versus those located at a distance from quarries.</td>
</tr>
<tr>
<td>INTENDED USE</td>
<td>This study is intended only to be used for analysis purposes. This study is not intended to be used for any other purpose.</td>
</tr>
<tr>
<td>INTENDED USERS</td>
<td>This study is intended for use only by Scotian Materials Limited. This report is not intended to be utilised by any other party.</td>
</tr>
<tr>
<td>EFFECTIVE DATE OF ANALYSIS</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; January 2015. All data is effective as of dates indicated.</td>
</tr>
<tr>
<td>DATE OF INSPECTION</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; January 2015.</td>
</tr>
<tr>
<td>IDENTIFICATION OF PROPERTIES</td>
<td>Residential house sales in Halifax Regional Municipality, 2004 – 2014, transacted via MLS® and recorded in Turner Drake &amp; Partner Ltd.’s CompuVal® Residential Database.</td>
</tr>
<tr>
<td>CLASSIFICATION OF PROPERTIES</td>
<td>(1) Less than two (2) kilometres from an existing quarry.</td>
</tr>
<tr>
<td></td>
<td>(2) Two (2) through five (5) kilometres from an existing quarry.</td>
</tr>
<tr>
<td></td>
<td>(3) Further than five (5) kilometres from an existing quarry.</td>
</tr>
</tbody>
</table>
AREA DATA

The Greater Halifax Area encompasses the three former municipalities of Bedford, Dartmouth and Halifax, and all of the former County of Halifax. It is the urban heart of the Halifax Regional Municipality (HRM) which was spawned by the amalgamation of the four municipalities in 1996. The 2011 census recorded a total population for HRM of 390,398 primarily located in an urban area covering 283 square kilometres. Halifax is the provincial capital and the largest city in Atlantic Canada. It is the Atlantic Region’s financial and business centre, the Canadian Navy’s East Coast base, and the location of many federal government offices and other facilities. HRM hosts six universities and as a result is home to a large concentration of educational, medical and research facilities.

HRM benefits from excellent air, rail, road and water linkages. Halifax International Airport links the region with the remainder of Canada, and the world. The airport is the busiest airport in Atlantic Canada, handling in excess of 3,600,000 passengers and 80,000 flights per year. In December 2004, the airport was granted United States “pre-clearance” status, allowing travellers to clear US customs in Halifax. A $28-million project to lengthen the main runway was completed in the fall of 2013. HRM is also well served by its highway network, which connects the area with the remainder of Atlantic Canada and the Northeastern U.S. Rail services to HRM provide a linkage with Central Canada and the Midwest U.S. The Port of Halifax is the focal point of the region’s transportation network, handling 4.1 million metric tonnes of cargo in 2013. In 2014, 217,305 passengers on 134 cruise ships visited HRM through the Port of Halifax, down 13.8% from 2013. The Port is undergoing two major infrastructure projects funded by the Port Authority and Federal Government in an effort to position Halifax as the Atlantic Gateway for cargo coming to North America across the Atlantic Ocean. In October 2011, HRM’s Irving Shipbuilding was selected for a potential $25-billion worth of contracts from the federal government to build 21 artic/offshore patrol ships; it is anticipated that this will create approximately 4,000 jobs in the province. Irving has invested $175 million, of the planned $300 million, to modernize its shipyard in anticipation for shipbuilding construction expected to begin 2015.

The breakdown of employment in HRM by sector is as follows:

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>11%</td>
</tr>
<tr>
<td>Business, Finance &amp; Administration</td>
<td>20%</td>
</tr>
<tr>
<td>Natural &amp; Applied Sciences &amp; Related</td>
<td>7%</td>
</tr>
<tr>
<td>Health</td>
<td>7%</td>
</tr>
<tr>
<td>Social Sciences, Government Services &amp; Religion</td>
<td>5%</td>
</tr>
<tr>
<td>Education</td>
<td>5%</td>
</tr>
<tr>
<td>Arts, Culture, Recreation &amp; Sport</td>
<td>4%</td>
</tr>
<tr>
<td>Sales &amp; Service</td>
<td>26%</td>
</tr>
<tr>
<td>Trades, Transport &amp; Equipment Operations</td>
<td>12%</td>
</tr>
<tr>
<td>Primary Industries</td>
<td>1%</td>
</tr>
<tr>
<td>Processing, Manufacturing &amp; Utilities</td>
<td>2%</td>
</tr>
</tbody>
</table>
Overall Construction Activity

The following figures on construction activity, as evidenced by the number and value of building permits, were provided to us by Halifax Regional Municipality:

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Total Construction Values (in $ millions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Residential</td>
<td>$409.640</td>
<td>$489.418</td>
<td>$513.144</td>
<td>$583.794</td>
<td>$409.307</td>
</tr>
<tr>
<td>- Commercial/Industrial</td>
<td>$206.247</td>
<td>$197.743</td>
<td>$229.188</td>
<td>$315.802</td>
<td>$241.069</td>
</tr>
<tr>
<td>- Institutional</td>
<td>$63.286</td>
<td>$65.945</td>
<td>$38.166</td>
<td>$82.527</td>
<td>$53.465</td>
</tr>
<tr>
<td>Total</td>
<td>$681.578</td>
<td>$770.469</td>
<td>$800.724</td>
<td>$992.978</td>
<td>$703.841</td>
</tr>
<tr>
<td>(b) Building Permits by Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Residential</td>
<td>3,002</td>
<td>2,007</td>
<td>2,913</td>
<td>3,018</td>
<td>2,366</td>
</tr>
<tr>
<td>- Commercial/Industrial</td>
<td>587</td>
<td>562</td>
<td>618</td>
<td>597</td>
<td>664</td>
</tr>
<tr>
<td>- Institutional</td>
<td>30</td>
<td>34</td>
<td>50</td>
<td>35</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>3,897</td>
<td>2,603</td>
<td>4,998</td>
<td>4,805</td>
<td>3,051</td>
</tr>
</tbody>
</table>

With an estimated population of 414,619 (1st July 2014), the Halifax CMA has experienced an average annual growth rate of 1.22% during the years 2009-2014. The latest unemployment rate (January 2015) is 6.1% compared to a provincial average of 8.4% and a national rate of 6.6%. The average household income of $87,709 (2014) is above that of other major centres in the Maritimes: Fredericton ($83,377), Moncton ($79,457), Saint John ($72,971), Charlottetown ($78,867); and below that of St. John’s ($102,266).
LITERATURE REVIEW

Literature and studies on the topic of the impact of quarries on residential housing prices appears to be very limited. We were unable to locate any literature on the topic of the impact of quarries on residential house prices via our search of the following sources:

1. Royal Institution of Chartered Surveyors;
2. Appraisal Institute of Canada;
3. Appraisal Institute of America;

We therefore expanded our search to encompass other sources of information. A widely quoted study conducted by Professor Diane Hite of Auburn University in Alabama, entitled “Summary Analysis: Impact of Operational Gravel Pit on House Values, Delaware County, Ohio” (2006), utilised a hedonic pricing model to examine the effects of distance from a gravel mine on the sale price of 2,552 residential properties. The study period was from 1996 to 1998 and the gravel mine was 250 acres in size (101 hectares). Hite found a statistically significant effect of distance from the gravel mine on the sale price of homes in the area. The impact was found to be curvilinear. George A. Erickcek, Senior Regional Analyst with the W.E. Upjohn Institute for Employment Research, used Dr. Hite’s model to assess the potential impact of a proposed gravel mine in Richland Township, Michigan, in August 2006. His results were then translated from miles to kilometres by The Centre for Spatial Economics for a report entitled “The Potential Financial Impacts of the Proposed Rockfort Quarry” (26th February 2009), which quarry was to be 89 hectares in size. The results suggest the following impacts on house values by distance from the gravel mine:

It is noted that the above studies are each concerned with quarries significantly larger in size than the ± 4.0 hectare quarry proposed by our client. Without replicating the model on the much smaller quarry, which is beyond the scope of this report, no conclusion can be drawn regarding whether the impacts on house prices would be of a similar scale.

We must note that we were unable to source a copy of Dr. Hite’s original study. We attempted to contact her directly, as well as to source the via various academic library resources, including Auburn University, to no avail. Information found online indicated that other interested parties had similar difficulty obtaining a copy. The study is not listed under Refereed Publications for Dr. Hite on her online CV.

HALIFAX QUARRIES

Our analysis focussed on four existing quarries in Halifax, identified by the client:

1. Gateway Quarry, located west of Highway 102 between Lacewood Drive and Kearney Lake Road;
2. Rocky Lake Quarry, located to the southeast of Rocky Lake Drive near Duke Street;
3. Conrad's Quarry, located east of the Forest Hills Extension near Montague Road;
4. Porters Lake Quarry, located north of Highway 7, off Alps Road.

Each of the first three quarries is located adjacent the municipal service boundary, so nearby houses are serviced by Halifax Water. Porters Lake Quarry is located outside of this boundary; homes in its proximity are on wells and septic systems, and therefore potentially more susceptible to any impacts the quarry might have on the ground water. It is the smallest of the comparable quarries, and considered to be the most similar to the proposed subject quarry, having regard to size and location outside the municipal service boundary and farther from the city centre.

Quarries in Nova Scotia are regulated provincially. The minimum setback requirement for quarries is 800 metres from the foundation or base of any unrelated structure. However, since building permissions in Halifax are granted by the municipality, the regulations of which do not include setback requirements from a quarry, there are cases where structures, including residential houses, have been permitted by the city to be developed within 800 metres of existing quarries.

Residential House Sales

We took as our source of residential house sales our CompuVal® Residential Database, which details over 167,000 residential sales which were conducted via the MLS® system since 1978 in Halifax. The database is geocoded, and also features a variable for Community, based on the 198 distinct communities located within Halifax. We coded the dataset of transactions based on distance from the four existing quarries, in one kilometre increments, up to five kilometres distant. The results of our analysis indicated that classifying properties within a two kilometre distance from an existing quarry was the most appropriate measure of proximity to a quarry, having regard to the limited number of properties located within one kilometre of most quarries. We aggregated the properties located 2-5 kilometres, and classified all those located within the same communities but further than 5 kilometres from the quarry as control groups; two classifications were required, having regard to the proximity of the urban quarries to one another: there was overlap between the zones extending from each quarry. The quarries predate the 1970s, so it was not possible to analyse sales based on a change in market value prior to, versus after, the establishment of the quarry. Therefore, we analysed price trends over time to determine whether housing prices for properties near a quarry were lower than those not near a quarry, and whether there was a difference in the rate at which property values increased over time. We limited our analysis to sales occurring in the past ten years (2004-2014) in order to provide the most relevant information for current market trends and conditions.

We identified the communities in which each quarry is located, as well as those intersected by the two kilometre radii from the quarry (i.e. the communities in which residential dwellings considered to be proximate to the quarry are located). Each property within these communities was coded according to whether it was located within two kilometres of a quarry, two to five kilometres from a quarry, or further than five kilometres from a quarry.

Housing units were classified according to style, aggregated as “detached”, “semi-detached” (includes row), and “mobile homes”. Detached houses represent the majority of sales transactions, and are considered to be the best indicator of pricing patterns for this analysis. The prevalence of semi-detached/row housing is very much location dependent: in some areas it is a common housing style, while in other areas just a few sales transactions are represented by attached housing.

We note that mobile homes represent the smallest number of sales; one transaction may have a larger impact on the mean yearly price than if the total number of sales was greater. As well, this housing style has several unique factors which impact its value as distinguished from detached and attached housing, having regard to the mobile nature of the structure. In many cases, mobile homes are located on leased lots; under such a circumstance, the sale price covers the cost of the home, but not the land. The
management company for the park in which the home is located has significant influence over the value of the land lease included in the transaction, a locational consideration which is absent in the case of the other property types. In other cases, the structure may be located on freehold land included in the sale price. In this study no distinction was made between mobile homes on leased versus owned land, nor was an analysis conducted with regard to the various management companies of mobile home parks. The data on prices for mobile homes was found to be of little use in this study, but it has been included for reference purposes.
Quarry 1: Gateway Quarry

The Gateway Quarry is an approximately 42 hectare quarry established in the early 1970s. It is located to the west of Highway 102, near Kearney Lake Road. Across the highway to the east is an established, growing residential and commercial area centred on Clayton Park West. There is also some residential development on the same side of the highway, to the north of the quarry, around Kearney Lake itself. The houses closest to the quarry are located ± 200 metres from the quarry on each side of the highway.

The following graphs show mean annual sale prices for residential homes classified according to distance from the quarry, and distinguished by style of property. Outliers have been removed.²

² Sale prices ± 3 std. deviations of the mean value per year. We note that all outliers were at the top end of the range (i.e. no values < -3 std. deviations).
For this quarry, the best indicators of the impact of a quarry on sale prices for residential houses are detached and semi-detached housing styles; while there are mobile home sales in the 2-5 kilometre zone and within the local communities but further than 5 kilometres from the quarry, there are insufficient sales of this housing style within 2 kilometres of the quarry to draw relevant conclusions.

The annual mean sale price for each of detached and semi-detached property types in this grouping is actually highest within 2 kilometres of a quarry. For detached properties, there appears to be very little distinction between the mean sale prices for homes located within 2-5 kilometres of the quarry versus those located further afield. It would, in all likelihood, be erroneous to conclude that proximity to a quarry was responsible for the higher mean prices, but it does indicate that the presence of a quarry in the vicinity has not precluded the construction or sale of higher value homes in the area. We note that the average age when sold of houses in this area is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Detached</th>
<th>Semi-Detached</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 km</td>
<td>15 years</td>
<td>7 years</td>
</tr>
<tr>
<td>2-5 km</td>
<td>22 years</td>
<td>13 years</td>
</tr>
<tr>
<td>&gt; 5 km</td>
<td>27 years</td>
<td>18 years</td>
</tr>
</tbody>
</table>

Overall, it appears that there is no significant negative impact on housing prices due to the proximity of a quarry in this geographic area.
Quarry 2: Rocky Lake Quarry

The Rocky Lake Quarry is an approximately 265 hectare quarry established in the 1950s. It is located to the southeast of Rocky Lake Drive, near the Bedford Industrial Park. There is some residential development along Rocky Lake Drive; most of it is at least one kilometre from the quarry, though a few houses are located within the one kilometre buffer zone. The houses closest to the quarry are located ±300 metres away.

The following graphs show mean annual sale prices for residential homes classified according to distance from the quarry, and distinguished by style of property. Outliers have been removed.³

³ Sale prices ± 3 std. deviations of the mean value per year. We note that all outliers were at the top end of the range (i.e. no values < -3 std. deviations).
For this quarry, the best indicators of the impact of a quarry on sale prices for residential houses are again detached and semi-detached housing styles; mobile home sales outside the 1-2 kilometre zone are sporadic and insufficient to support relevant conclusions.

The annual mean sale price for each of detached and semi-detached property types in this grouping is highest within the 2-5 kilometre zone. We note that there are very few houses located within one kilometre of the quarry, so the majority of sales within two kilometres of the quarry are actually located between one and two kilometres from the quarry. For detached properties, there appears to be very little distinction between the mean sale prices for homes located within 2 kilometres of the quarry versus those located more than 5 kilometres away; in 2014, the mean sale price for all distance zones from the quarry have converged, with mean sale prices for each zone within a $5,000 range. This convergence of mean sale prices across zones has occurred at a few other points over the study period for each of detached and semi-detached homes: there does not appear to be a clear pattern suggesting there is a fixed cause of lower house prices in one zone versus another, as would be expected if the quarry was negatively impacting sale prices. Nor does the quarry appear to be impacting construction in its vicinity versus the other areas: the average age when sold of houses in this area is as follows:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Detached</th>
<th>Semi-Detached</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 km</td>
<td>21 years</td>
<td>14 years</td>
</tr>
<tr>
<td>2-5 km</td>
<td>24 years</td>
<td>19 years</td>
</tr>
<tr>
<td>&gt; 5 km</td>
<td>22 years</td>
<td>15 years</td>
</tr>
</tbody>
</table>

Overall, it appears that there is no significant negative impact on housing prices due to the proximity of a quarry in this geographic area.
CONRADS QUARRY
Quarry 3: Conrads Quarry

The Conrads Quarry is an approximately 160 hectare quarry established in the 1950s. It is located to the east of the Forest Hills extension (Highway 107), near Lake Charles. There is some residential development nearby, including higher end homes. The houses closest to the quarry are located within ±100 metres.

The following graphs show mean annual sale prices for residential homes classified according to distance from the quarry, and distinguished by style of property. Outliers have been removed.⁴

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⁴ Sale prices ± 3 std. deviations of the mean value per year. We note that all outliers were at the top end of the range (i.e. no values < -3 std. deviations).
For this quarry, the best indicator of the impact of a quarry on sale prices for residential houses is limited to detached housing styles; sales of semi-detached and mobile properties within 2 kilometres of the quarry are insufficient to support relevant conclusions.

The annual mean sale price for detached property types in this grouping is actually highest within 2 kilometres of a quarry, possibly due to the proximity to Lake Charles. We note that there are few houses located between one and two kilometres of this quarry, so the majority of sales in this zone are actually located within one kilometre of the quarry. For detached properties, there appears to be very little distinction between the mean sale prices for homes located between two and five kilometres of the quarry versus those located more than 5 kilometres away. Nor does the quarry appear to be impacting construction in its vicinity versus the other areas: the average age when sold of houses in this area is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Detached</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 km</td>
<td>17 years</td>
</tr>
<tr>
<td>2-5 km</td>
<td>23 years</td>
</tr>
<tr>
<td>&gt; 5 km</td>
<td>26 years</td>
</tr>
</tbody>
</table>

Overall, it appears that there is no significant negative impact on housing prices due to the proximity of a quarry in this geographic area.
Quarry 4: Porters Lake Quarry

The Porters Lake Quarry is an approximately 8 hectare quarry. It is located approximately 3 kilometres north of Highway 107, off Alps Road to the east of Porters Lake. There is little residential development nearby, and most of it is at least one kilometre from the quarry, though a few houses are located to the south within the one kilometre buffer zone. The houses closest to the quarry are located ±800 metres away: it is the only quarry without buildings located within the 800 metre set back zone required by the province. This quarry appears to be most comparable to the proposed subject quarry, both in terms of its size and its location outside of the urban, serviced area. The proposed quarry has no residential properties located within one kilometre of the quarry, and very few located within two kilometres. Most of the residential properties located within five kilometres of the proposed quarry are separated from it by Highway 102.

The following graphs show mean annual sale prices for residential homes classified according to distance from the quarry, and distinguished by style of property. Outliers have been removed.\(^5\)

\(^5\) Sale prices +/- 3 std. deviations of the mean value per year. We note that all outliers were at the top end of the range (i.e. no values < -3 std. deviations).
For this quarry, the only indicator of the impact of a quarry on sale prices for residential houses is detached housing styles; there were no sales of semi-detached homes in any community located within five kilometres of the quarry, and mobile home sales in the area are insufficient to support relevant conclusions.

The zone with the highest annual mean sale price for detached property types in this grouping varies widely by year: there does not appear to be a clear pattern suggesting there is a fixed cause of lower house prices in one zone versus another, as would be expected if the quarry was negatively impacting sale prices. We note that there are few houses located near this quarry, and Porters Lake serves to separate from the quarry many of those which are located within the 5 kilometer zone. It is an area with very little residential development, unlike the more urban areas surrounding the other three quarries.

The average age when sold of houses in this area is as follows:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 km</td>
<td>14 years</td>
</tr>
<tr>
<td>2-5 km</td>
<td>16 years</td>
</tr>
<tr>
<td>&gt; 5 km</td>
<td>18 years</td>
</tr>
</tbody>
</table>

Overall, it appears that there is no significant negative impact on housing prices due to the proximity of a quarry in this geographic area.
Proposed Quarry

The Proposed Quarry is an approximately 4 hectare quarry. It is located approximately 5 kilometres from the Halifax Stanfield International Airport, to the southeast of Highway 102. There is little residential development nearby, and most of it is at least two kilometres from the quarry on the opposite side of the highway, though a few houses are located to the southwest within the one and two kilometre buffer zones. The houses closest to the quarry are located ± 1,500 metres away: there are no buildings located within the 800 metre set back zone required by the province. It is located outside of the urban, serviced area.

The following graph shows mean annual sale prices for residential homes classified according to distance from the quarry; there were no sales of semi-detached properties, nor sufficient sales of mobile homes in the vicinity to support relevant conclusions. Outliers have been removed.\(^6\)

![Graph showing mean annual sale prices for residential homes classified according to distance from the quarry.]

It would appear that houses located farther afield from the proposed quarry generally achieve higher sale prices than those located 2-5 kilometres from the site of the proposed quarry. Sales within two kilometres of the proposed quarry site were almost exclusively located within the Miller Lake West subdivision, which opened in 2003, with most homes constructed between 2003 and 2010. The average age when sold of houses in this area is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Detached</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2 km</td>
<td>3 years</td>
</tr>
<tr>
<td>2-5 km</td>
<td>14 years</td>
</tr>
<tr>
<td>&gt; 5 km</td>
<td>11 years</td>
</tr>
</tbody>
</table>

We note that the proposed quarry is near the Halifax Stanfield International Airport and Aerotech Business Park, which have likely limited residential development in the vicinity, and are likely to continue to do so for the foreseeable future. A quarry would appear to be a more compatible land use for the airport and business park than would residential housing.

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\(^6\) Sale prices ± 3 std. deviations of the mean value per year. We note that all outliers were at the top end of the range (i.e. no values < -3 std. deviations).
CONCLUSION

This analysis studied the variations between mean sale prices for houses according to proximity to an established quarry. While the limited results of our literature search indicated that there may be some cause for concern regarding a negative impact on the prices of houses located proximate to a large gravel mine, the results of this study do not provide a clear indication that such is the case in Halifax. Rather, there appears to be no clear pattern for the relationship between mean selling price of houses and their location relative to quarries.

We caution that this study does not constitute a hedonic pricing model isolating the impact of quarries on the selling prices of houses. However, taken in aggregate, and having regard to the apparent lack of impact on either development patterns or selling prices, it would appear that there is limited, if any, effect on the residential property market due to quarries. Provincial regulations dictate that quarry operations must be 800 metres distant from any existing structure. It must be noted in this context that should municipal regulations be changed to be consistent with this rule, it would effectively sterilise for development all land within this zone. This would almost certainly impact its market value.

Residential development in general pushes outward from the city centre as there is more aggregate demand for housing. Quarries which were once located at some distance from urban areas now have residential developments creeping towards them, as evidenced by the lower average age built at the date of sale for the zones nearest each quarry. Combined with the high mean prices of houses near the urban quarries especially, it would appear that the presence of quarries has not adversely impacted the development even of higher end homes in the vicinity.
CERTIFICATION

Re: Market Analysis of the Impact of Quarries on Housing Prices, Halifax, NS

I certify that, to the best of my knowledge and belief:

the statements of fact contained in this report are true and correct;

the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analyses, opinions, and conclusions;

I have no present or prospective interest in the properties that are the subject of this report, and no personal interest with respect to the parties involved;

I have no bias with respect to the properties that are the subject of this report or to the parties involved with this assignment;

my engagement in this assignment was not contingent upon developing or reporting predetermined results;

my compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favours the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this report;

my analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice (USPAP); and meets or exceeds the Canadian Uniform Standards of Professional Appraisal Practice;

I have made a personal inspection of the properties that are the subject of this report;

James Stephens, B.Sc., Adv.Dip. GISB, provided significant professional assistance to the person signing this report.

27th February 2015
Date

ALEXANDRA BAIRD ALLEN, B. A., Adv.Dip. GISB, DULE
AIC Candidate Member
NSREAA #908147