

Reuses of closed schools in Windsor, Ontario

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Abstract

Fifty-two schools have been closed in Windsor, Ontario, Canada, since the earliest-recorded one in 1959, with only three remaining vacant and for sale as of late-2004. Twenty of the 49 reused closed schools have been either redeployed, transferred, or sold at a nominal price without ever being on the market; 14 of these have reopened with an educational use. At the same time, 29 have been sold at market prices, with 13 of these reused for new houses or conversions to apartments and condominiums, and 10 for institutions such as offices. The current study refines and operationalizes a theoretical urban-economic development rule for measuring the optimality and efficiency of these 29 closed schools' current reuses. The finding was that, while most current reuses are not suboptimum, they are also not efficient, especially since their current property values significantly exceed their sale prices as closed schools. This finding is assessed in terms of public policy for the reuse of small vacant urban sites.

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1. Introduction

Public and private organizations, similarly to individuals, must decide how to dispose of their surplus possessions. Also similarly, organizations' primary possessions are usually their buildings and land, and, under normal circumstances, they should neither retain their closed facilities as vacant and disused, nor abandon them (e.g., [1,2]). However, a closed, non-residential building, together with its site, will have economic, environmental, and social attributes that deter either its simple or adaptive reuse, or redevelopment by the current, or a new owner [3–5]. Its subsequent ineffective and/or untimely reuse may therefore create problems for public policy [6,7].

Surplus buildings and sites in the current study include 52 schools closed by two school boards in Windsor, Ontario, Canada, since 1959.¹ In principle, a closed school will be more easily reusable for people-intensive

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¹Two Windsor school boards, a public school board and a Catholic separate school board, closed all but ten of the schools prior to the beginning of 1998 when they amalgamated with the corresponding public and Catholic separate school boards in neighbouring Essex County. Although the Catholic separate board has had a more serious financial deficit than the public board, due to its increased enrolments, both boards have had similar procedures and reasons for closing their schools. School closures were their public response to declining enrolments and financial deficits, and their private response to the conditions of some properties and the need for revenues from sales.

services than would other brownfield sites with, for example, an inaccessible location, a potentially toxic environment and building, and/or a divided ownership (e.g., [8]). In reality, a closed school's reuse may be more constrained than that of a comparable privately owned building (and site). In particular, the school's owner is generally a public organization whose administrators have both legal regulations and social and political constraints imposed on their disposal of surplus property.

The current study responds to these circumstances by analytically measuring the economic pay offs and efficiency of the reuses of closed schools sold in the private market place. In addition to testing for deterrents on reuse, this urban-economic analysis clarifies a school board's decision-making about a closed facility, as well as community residents' criticisms of its closure and reuse. For example, the operating- and capital-cost savings justifying a closure may be inflated with hypothetical revenue from a school's sale or lease. Alternatively, if a closed school is sold at a much lower price than justified by its eventual reuse's property value, then such inefficiency compounds the earlier issue of not maximizing the cost savings from that closure [9].

During the closure review of their school, residents often worry about the type and timing of reuse. Indeed, its reuse may only be revealed after closure, when the school board no longer has responsibility for the facility. Thus, the importance of our analysis.

1.1. Literature review

Much less is known about organizations' reuses of surplus properties than about their reasons for closing them in the first place (e.g., [10,11]). There are a few older descriptions of planned, or actual, reuses of individual closed schools [12–14], including relevant bibliographies [15,16]. Two recent exceptions concerned with other types of reuse include studies of closed airfields and brownfield sites in the UK.

The types of closed airfields reuse correspond with the alternatives for closed schools [17,18]. The reopening of a closed airfield for either pre-closure (but now private) aviation use, or a related (museum, show or festival) use, is analogous to a closed school's redeployment with a new educational function, or its institutional reuse as offices or a place of worship. The preservation of a closed airfield resembles the historical practice of mothballing a vacant closed school in the event of an enrollment turnaround. Reuse of an airfield's exurban site as a large housing or business estate, for example, could be scaled-down as a redevelopment of a closed urban school.

The non-economic behaviors of individual and institutional owners constrain the sale and reuse of brownfield sites. These could, similarly, either depreciate the asking or sale prices of a closed school, or postpone its reuse [19,20]. Moreover, property owners, and builders and developers may be inexperienced with the types and methods of reuse of small disused urban sites within a specialized private property submarket [21].

1.2. Scope of this study

The current study complements this earlier work by being first to describe the past and current reuses, and the timings, for a sample of closed schools in a given city. It further appraises the effectiveness of current reuses by comparing their observed economic values with those prescribed from an urban-economic development standpoint. Note that our analysis of individual properties excludes estimates of the social (de) valuation of a closed school site in a particular type of reuse. It also excludes any latent contribution to a site's value from possible amalgamation with, or buffering of, neighboring sites.

2. An urban-economic development rule for closed schools

An urban-economic development rule is a theoretical model of when, and implicitly where, a parcel of land will be redeveloped or reused. The model's assumptions involve the behavior of property owners, the temporal flow of services from land and buildings, and the operation of property markets. Its prescription is that a parcel ought to be reused when its present value in a new use, V^R , which capitalizes the preparation and (re-) construction costs, begins to exceed its present value from remaining in its current use, V^C : i.e., if $(V^R - V^C) > 0$.

Empirically, (1) reuse of an i th closed school property will be suboptimum if its current value, V_i^R , does not exceed its former value as a closed school, V_i^C . Its reuse will either be (2) efficient if its current value ‘just’ exceeds its former value, or (3) inefficient if its current value ‘significantly’ exceeds its former value. Inefficiency, for example, would be manifest when a closed school’s sale price was much too low for its reuse’s current value (in constant dollars).

This model’s prescriptions have, over time, statistically correlated with the real-world probabilities of urban commercial, industrial, and residential land-use redevelopments [22–24]. Despite this, at least three methodological limitations compromised the (three) noted studies’ descriptions of actual reuses:

- (1) They calculated the prices of developed sites as if they were undeveloped, and vice versa.
- (2) They inferred from similar actual, and optimum-predicted, percentages of redeveloped homes that the same small number of actually redeveloped homes were the optimally predicted ones (i.e., [24, p. 198]).
- (3) They presumed that their properties’ reuses and former uses were types sold within the same private property submarket.

In contrast, within the current study, the optimality and efficiency of the existing reuses of a sold subsample of 29 closed schools will be inferred from the relationship between their individual sale prices and assessed market values.

3. The value of a property’s new use, V^R

In theory, a rational-economic prospective owner of a closed school will invest the optimum land and non-land capital, S^* , in order to maximize both the projected revenue stream, and the value added to the property from reusing each unit of land, L : $R(t, S^*/L)$. Between 15% and 25% of this capital, S^* , is likely to be invested in the land component of an unimproved property, or a property with unusable improvements [25–27]. The amount of capital invested in the ‘land’ will increase from this minimum to virtually the full value of an improved property that can be simply, or adaptively, reused.

A prospective owner’s invested capital is assumed to have a unit cost, $c(t)$, at the present time, t , where the revenue stream is discounted from time t into the future at rate α . Often, there is myopic foresight about reuse and the resulting revenue stream (however, cf. [28]). That is, investors tend to make decisions as if (1) they will operate their planned reuse forever, even though they may later choose to alter it; and (2) the price per unit of service remains constant (at the initial level), even though they recognize that the quality of these services is likely to decline over time [29, p. 278].

A last assumption is that investors’ revenue is capitalized into priced values in a property market if the value of an i th parcel of land is expressed as the quantity of land units, $Q(L_i, S_i^*)$, at a unit price, P . The latter is considered a function of temporal market conditions, as well as the building and neighborhood attributes, X_i , of the relevant property submarkets. In sum, then, we have the following with two cost variables included:

$$V_i^R = (P^R(X_i^R)/\alpha) \times Q(L_i, S_i^*) - c(t)S_i^* - D^S(S_i^*/L_i, d_i) \times L_i - D^L(E_i) \times L_i. \quad (1)$$

In Eq. (1), if the optimum amount of structural capital for new use, S^* , is not directly observable at the time of sale; rather, it is assumed to be a function of the land area, L_i , and its location and attributes within the urban area, X_i^R : $S_i^* = s(L_i, X_i^R)$. Urban school sites are compact and reusable (the median size has been 1.1 ha in Windsor). Thus, this functional translation into real-world prices should not be distorted, by such factors as the transaction costs of land assembly and subdivision. In this regard, an assembled or subdivided parcel’s price will generally not be proportional to the original lot size(s) if the value compensates for transaction costs [23, p. 236].

3.1. Costs of reuse in general

The costs of reconstructing or demolishing (a part of) a building, D^S , and cleaning the site, D^L , must be subtracted from the present value of the revenue stream from the new use (in (1)) [22].

Some forms of school reuse will likely be uneconomical with the cost, D^S , of (usually) demolishing an existing ‘earlier-style’ building, S^\sim , which has deteriorated in condition to a point, d : $D^S = f(S^\sim/L, d)$. In Windsor, these earlier-style elementary schools are two- or three-story redbrick buildings with up to 12 high-ceiling classrooms and an add-on gymnasium. They were built during the 1920s on smaller-than-average sites, sometimes located on or near main roads in what have become the city’s older residential neighborhoods.

Fourteen closed schools were earlier-style elementary or secondary schools, with the latter 3–4-times larger than the former. Two-thirds of Windsor’s closed schools were thus of a ‘later style.’ The elementary schools in this group were single-story brick or cinderblock buildings from the 1950s or 1960s, with 12 classrooms and a gymnasium. The secondary schools were expanded two-story versions of these structures.

A closed school site will rarely require the environmental remediation of a brownfield site, $D^L = f(E)$, where E is an observable environmental variable representing the contamination liability from redeveloping the land. A prospective owner should therefore not need to conceal adverse information about a closed school site in order to circumvent credit-rationing by investors. Investors can, in turn, screen out high-risk developments with, for example, ceilings on the size of loans rather than through adjustments to their offering price [30].

Further, a closed school located inside an established residential neighborhood, often adjoining a municipal open space that doubles or triples the schoolyard’s area, should not create significant costs from contiguous development contingencies [31,32]. The success or failure of a development will thus likely not be contingent on the success or failure of simultaneous development on contiguous lots [30].

3.2. Two particular costs of reusing a closed school

Reuse of a closed school may have environmental costs due to the need for rezoning, for some other planning permission [7,33], or its eligibility for a development grant or subsidy [30]. Most school sites are zoned as exclusively permitting institutional uses. While varying from one municipality to another, these permitted uses generally include a place of worship, a day nursery, a business office/facility of a public authority/non-governmental organization, or another educational institution. Therefore, (1) a rezoning process may remobilize a neighborhood’s residents who politically opposed the closure, while (2) the prospect of financial assistance could see owners waiting for a better set of governmental subsidies. Nevertheless, at least in the Province of Ontario, Canada, the planning principles for small disused urban sites have gradually been standardized² [34–38].

While residents may wish for the preservation of a closed school site’s institutional use, a preferred planned alternative is a rezoning to residential use compatible with surrounding low-density housing [39,40]. For example, in Windsor, two planning objectives are “to recognize the opportunity to reuse surplus institutional properties by directing their transition to uses compatible with adjacent properties” and “to promote selective residential redevelopment, infill and intensification initiatives” [41], Sections 6.6.1.5 and 6.3.1.3. The potential problems for public policy created by the reuses of closed schools will be reconsidered in the Conclusion.

4. The value of a property’s current use, V^C

In theory, the present value of an i th property’s current use per unit of land area, L_i , is the discounted revenue from its building and neighborhood attributes, S_i^\sim , capitalized with equilibrium prices in the market, $P^C(X_i^C)$:

$$V_i^C = (P^C(X_i^C) \times Q(L_i, S_i^\sim)/\alpha). \quad (2)$$

In reality, this assumption about the equilibrium pricing of property attributes will not always be valid for the prices of closed schools as examples of small disused urban sites. A closed school may thus gain its permanent reuse as an educational facility or administrative office, a community center or a park, outside the

²This standardization is a result of decisions made by the Ontario Municipal Board (OMB). The OMB was created in 1897 as an adjudicative tribunal (<http://www.omb.gov.on.ca>). Since 1932, it has heard the appeals of individuals, organizations and municipalities against land use planning decisions in Ontario. An OMB decision may be appealed to the provincial minister solely on the grounds of a procedural irregularity.

operation of the private property market. That is, it will have a nominally priced transfer to another school board or a public organization, or a redeployment within the system that closed it, without ever having been on the market.

Otherwise, a closed school may be resold, reused and/or redeveloped for a private institution without a rezoning; and, for private houses, stores, or offices after a rezoning. A school board in the Province of Ontario, as in other Canadian provinces, is permitted to sell a “surplus property” to a private owner. However, it must first offer the property for sale or lease “at fair market value” until the “expiration of a 90-day period.” The buyer here must be other governmental bodies, such as local school boards, the municipality, the nearest university, the Crown, or the Ontario Realty Corporation [42], s. 194 (3), par. 1, [43]. The proceeds from such a sale or lease are applied “for the purposes of the board”, e.g., by adding them to its reserve fund for future expenditures on school sites or buildings [42], s. 194 (19), par. 21, [44].

4.1. Two reasons for lower sales prices of closed schools

Despite the above-noted conditions, one reason for a closed school not selling at an equilibrium price is that the school board’s administrators are often, initially at least, inexperienced with selling private property [26,27,45]. They could almost unintentionally rush or delay in listing a surplus property for sale, for example, if they are unsure about its marketability, or mismanage it within a large landholding. They could more deliberately delay in order to minimize any uncertainty about their own future property requirements, or to wait for the community to calm down after a school’s closure.

Another reason for a closed school not selling at an equilibrium price is that too few parcels with comparable attributes may have been traded in the market to establish such a price [46]. Comparable attributes may include those of the existing building, site, and neighborhood, as well as latent ones materialized by a specific type and/or method of reuse.

As discussed below, Windsor’s closed schools have ten combinations of five types of reuse, and three methods of reuse. A school board’s ignorance of a potential buyer’s valuation based on his or her ultimate reuse plans may confound its decision about a closed school’s marketability in a specialized submarket [47]. A closed school will especially have a lower sale price than similar properties not owned by a school board if this price is more a function of these market imperfections and ownership behaviors than the building-, site- and neighborhood-attributes. This hypothesis about the depreciated sales prices will be tested with data for Windsor’s closed schools, after excluding the nominally priced transferred or redeployed units.

5. Data

Initially, the data on 55 closed schools in Windsor, of which three have been closed twice, were gathered from the municipality’s paper and electronic records, the local school boards’ records and minutes of meetings, and the electronic-searchable and paper-copy reports in the local newspaper since the late-1970s.

The name(s) and address(es) of the current owner(s) of each closed school property, or its subdivided lots, were identified from the municipality’s electronic property database. The June-2004 assessed values of the properties at all but four of these addresses were listed in the paper- and electronic-records of the Province’s latest comprehensive assessment of properties’ market values [48]. The assessed values of four sites under redevelopment for housing were estimated from their published plans. Unfortunately, the historically assessed values of properties nearer to the dates of their reuse were not available either electronically or on paper-copy. In any case, their dollar-values had different measurement scales before and after implementation of a standardized province-wide market value assessment in 1997.

Next, for each closed school no longer owned by the school board that closed it, the date(s) of transfer or sale to a new owner(s), and sale price(s) were retrieved from either a school board’s records or minutes of meetings, the Province of Ontario land registration information system [49], or a newspaper report. In addition, the municipal property database summarized the building permits issued for each property, as well as the current, and some past dimensions, uses and zonings. The type and number of building permits classified the method of current reuse as either a simple one with a few alterations to an existing building; an

adaptive one with either major renovations or an addition to an existing building; or a redevelopment after a demolition.

5.1. *Classification of closed schools and their reuses*

These data were first used to classify the disposal, and current ownership (as of late-2004) of each of 52 closed schools or their subdivided lots into one of four classes:

- (1.1) Still owned by the Public or the Catholic Separate school board that closed it (10 schools).
- (1.2) Transferred for a nominal price to a public organization, including another school board, and the City of Windsor (13 schools); or sold in the private property market to either:
- (1.3) A public or non-profit organization (seven schools) or
- (1.4) A private individual or company (22 schools).

The data then helped classify each current and past reuse as one of six types:

- (2.1) Educational—if operated as a school for children or adults by either a public or a Catholic separate school board, or a private educational organization (this was the current use of 16 schools).
- (2.2) Housing—if either a conversion of an existing building, or new houses, or a combination of both (13 schools).
- (2.3) Institutional—if used, for example, as an office building, a place of worship, a museum, or a medical care facility (12 schools).
- (2.4) Community—if either a municipally owned and operated building, for example, as a community center, or a site redeveloped as a park (five schools).
- (2.5) Commercial—if either adaptively reused or redeveloped for retail or industrial services (three schools) or
- (2.6) Vacant and for sale—if a vacant building and site still owned by a school board, and listed for sale (three schools).

Finally, while excluding the three schools in (2.6), the data classified the method of current reuse as either (3.1) simple (25 schools), (3.2) adaptive (10 schools), or (3.3) redevelopment (14 schools).

6. **Current owners and reuses**

6.1. *Redeployed or transferred schools*

As of late-2004, 20 of 49 reused closed schools had been transferred or redeployed (see Fig. 1). Simple reuses have accompanied such transfers and redeployments, and 16 of 20 have hardly any visible alterations to their buildings' exteriors and sites.

Those school boards that still owned ten of their closed schools redeployed three for French immersion programs, and four for other educational programs, including adult education. In addition, these boards transferred seven closed schools between themselves for educational purposes; three to the municipality at nominal \$1 prices for reuse as two community centers, and a park redevelopment; and one each to the University of Windsor, and the Catholic Church (plus another one demolished on land possibly always owned by the municipality, and originally leased for commercial redevelopment).

Unexpectedly perhaps, a closed school in Windsor thus had a 27% chance of reopening with an educational use by a public or Catholic school board as its original, or new, owner. These 14 'public' educationally reused schools were likely designated for such use during their closure review, as nine realized it as their first reuse within 1 year of closure. More subtly, however, 10 of these 14 have reopened with different educational and social functions from before their closure. No longer serving solely the children in their neighborhoods, their young or adult students now arrive and depart in school buses and private motor vehicles from across the city.

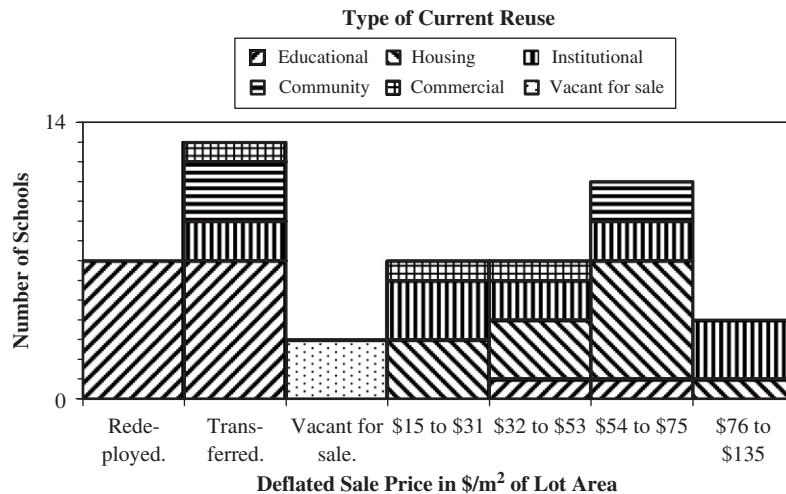


Fig. 1. Disposal of closed schools by type of current reuse.

6.2. Sold schools

Housing has been the reuse for 13 of 29 closed school properties sold at market prices (see Fig. 1). Four have been redeveloped as new single-detached houses along one side of a street inside the existing road and utility network, with a fifth transformed into 14 suburban townhouses on a 0.4 ha site annexed to a new neighborhood. Two more residential infills were under construction as of late-2004.

Three closed school buildings have had adaptive conversions to apartments or condominiums since 1993—and one more was planned as of late-2004. Two remaining sites, redeveloped for a six-story 98-unit high-rise apartment building on 0.92 ha, and 34 townhouses on 1.28 ha, had special government funding and zoning regulations that were discontinued after their construction during the late-1980s.

The permanent housing reuses have historically been the most delayed. One anomalous school site was disused for 29 years until housing became its first and current reuse. The remainder's houses were built after a shorter median post-closure lag of 9 years. These sites were never disused, however. All but one had at least one prior temporary non-educational reuse after a median 1-year delay from when they were closed.

Otherwise, as shown in Fig. 1, 16 closed schools currently have one of four remaining types of reuse as institutions such as offices (10 schools), a commercial or a retail facility (two schools), a community center or a park (two schools), or private schools (two schools). Nine simple reuses are mostly for offices, as are five adaptive reuses. Two are redevelopments for a park, and a vacant green space buffering the expansion of a commercial/industrial building.

7. Current and former values

7.1. Sale prices

The 29 sold closed schools had a mean recorded sale price of \$430,000, with a 95% confidence interval between \$295,000 and \$565,000, and a range from \$90,000 to \$2 million (in Canadian dollars). Each of their sale prices was temporally inflated or deflated by the following three calculations in order to be commensurate with the June-2004 assessed values that are their reuse's current values:

- (1) A carrying cost of capital was simulated by compounding a sale price at an assumed rate of 6% per annum for the period between the dates of the sale and a reuse's later opening (only two schools had a longer period than 2 years between these dates).

- (2) A sale price was inflated to, or deflated from, the appropriate date of sale or opening to June 2004 using Statistics Canada's monthly consumer price index for shelter costs [50]. After this 'deflation,' the 29 schools' mean sale price was \$512,000, with a 95% confidence interval from \$362,000 to \$662,000.
- (3) Each school's deflated sale price was prorated per unit of its lot area. The mean and 95% confidence interval of these was $\$54/\text{m}^2 \pm \$11/\text{m}^2$, with a range from $\$15/\text{m}^2$ to $\$135/\text{m}^2$ (see Fig. 1).

7.2. Assessed values

These 29 schools' mean assessed value per unit of lot area, and 95% confidence interval, was $\$245/\text{m}^2 \pm \$77/\text{m}^2$. Their assessed market values ranged from $\$12/\text{m}^2$ for the vacant green-space next to an expanded commercial/industrial building, to $\$1,012/\text{m}^2$ for a 15-unit condominium conversion on a small 0.21 ha lot. Each of these values should be in equilibrium if an owner appeals a resultant higher property tax burden than that of a similar property. In reality, the June-2004 assessed values will accurately measure the current values of 15 closed school properties reused after implementation of the new province-wide market value assessment in 1997. The values are likely accurate for 14 closed schools with current reuses dating from as early as 1980 if monotonically increasing prices in their submarket are assumed.

7.3. Correlation analysis

The closed school properties' per-unit-area assessed values were statistically correlated ($r = 0.58$; $\alpha < 0.01$) with their classified types of reuse (where 0 = educational, institutional, or community, and 1 = housing or commercial). However, their per-unit-area deflated sale prices were not correlated (at $\alpha < 0.01$) with either of these variables or, in fact, with any other measures of either the former school building and its location; the types, methods and timings of reuse; or the current neighborhood (except for the percentage of adult residents employed in manufacturing, where $r = -0.68$). The null hypothesis that these prices were not at equilibrium is therefore supported.

Further illustrating their variability within a type of reuse, one school site with housing had the fifth-lowest deflated sale price of $\$19/\text{m}^2$, whereas another had the second-highest of $\$110/\text{m}^2$ (see Fig. 1).

In this and later correlations, a former school building and site was measured with its pre-closure ownership by either the Public or the Catholic separate school board; the dates of its opening and its closure; its numbers of floors and classrooms, and presence/absence of a gymnasium; its lot size; and its distance from downtown in kilometers.

Each school's current reuse was measured in terms of its type, its method, and the years from closure to reopening. Two variables representing the former reuses were: years between a school's closure and its first reopening, and its total number of changes in use.

Finally, a school's current neighborhood was defined as the dissemination area (DA) containing its street address. These DAs are the smallest geographical areas for which Statistics Canada distributes year-2001 Census of Canada data. Metropolitan Windsor has 547 DAs, with an average population of 685 residents. Ten social and economic characteristics were extracted for DA residents and their properties:

- (1) The LN-transformed average income of the adults and average estimated private-dwelling price, and the percentage of single-detached houses.
- (2) The percentages of families either headed by a lone parent, or having children at home.
- (3) The percentages of residents who were either manufacturing-workers, young-adults aged 20–24-years old, university-educated, unemployed, or movers during the previous 5 years.³

8. Analysis of differences between assessed values and sale prices

In our analysis, the inequality between a reused school's current and former values was measured as a percentage-difference from unity of the ratio between a proportion of its current per-unit-area assessed value,

³A copy of this large 29×29 correlation matrix is available from the author.

and its per-unit-area deflated sale price as a closed school. That is, the scale of these ratios was transformed so that unity indicated a zero percentage difference, and the fractions below and above unity, the negative and positive percentage differences from nominal.

The proportion of an assessed value in the numerator of a ratio represents the contribution of the capitalized investment in the former school’s building and land towards the current value of the reuse. The remainder is equal to the amounts of new capital invested in demolition for, and/or construction of, the reuse after the original sale. These proportions were estimated from the literature e.g., [51]. Neither the land titles nor the assessment records distinguish between a property’s land, its buildings, and their alterations as attributes in a sale price or an assessed value. The proportion for 12 redevelopments with a demolition permit was 20%, 30% for eight adaptively reused schools, and 80% for nine simple reuses with no documented alterations to the existing school buildings and sites in the municipal property database.

In our analysis of the ratios of values:

- (1) A ‘small’ positive percentage difference indicates an efficient reuse with its current value ‘just’ exceeding its former value.
- (2) A ‘significantly larger’ positive percentage difference indicates an inefficient reuse.
- (3) A zero or negative percentage difference from a ratio of unity indicates a suboptimum reuse.

In the full sample, the mean percentage difference and 95% confidence interval was $61\% \pm 42\%$, with a maximum (in an admittedly peaked and positively skewed distribution) of 454% for one school’s conversion into condominiums in 1999

8.1. Suboptimum reuses

Seven current reuses of 29 closed schools had negative percentage-differences for the ratios of their values (see Fig. 2). The most negative two (with their percentage differences) were a vacant green space next to an expanded commercial/industrial building (–85%), and a community park (–93%). These two, together with another transferred closed school, are examples of a school’s demolition for open space. Their assessed values are ‘naturally’ much lower than their sale prices in the private market. These properties may have violated an assumption of the model by deriving their higher former values from their locations within larger assemblies of land, such as required either to buffer the expanded commercial/industrial building, or to enlarge a neighborhood open space.

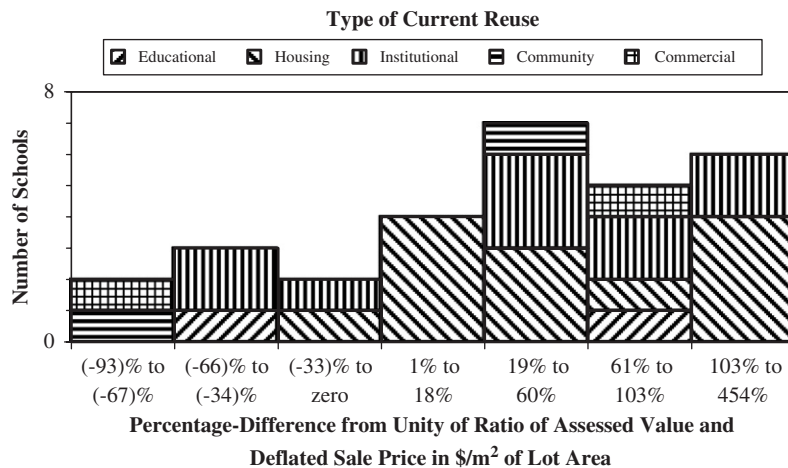


Fig. 2. Differences between assessed values and sale prices for types of current reuses.

Less confidently suboptimum are a (late-2003) adaptive conversion for a private seniors' institution (−6%), and a (2001) redevelopment for six new single-detached houses (−0.3%): Their negative percentage differences might have been positive within the margin of error in their data. Analogously, two adaptive reuses for a hospice institution (−41%), and a private educational school/place of worship (−44%), would have had positive percentage differences if classified as simple reuses. Finally, an institutional reuse for an office building and its surrounding parking lot (−39%) is probably temporary; until its university-owner no longer neglects the property as it has done during the past 10 years.

8.2. *Efficient and inefficient reuses*

Four schools redeveloped for single-detached houses are efficient because their current values only exceeded their former values as closed schools by up to 19% (the lower boundary of the confidence interval). Much less efficient are six reuses with current values more than 103% (the upper boundary of the confidence interval) higher than their prices as closed schools. One has the same type of redevelopment for single-detached houses as the efficient reuses, while three are conversions for apartments or condominiums. The remaining two are simple institutional reuses for an office/place of worship, and a science museum.

Less conclusively efficient, or not, are 12 diverse reuses with current values between 19% and 103% higher than their former values (i.e., between the confidence interval's lower and upper boundaries). These include four housing redevelopments; four simple and one adaptive institutional reuse; and an adaptive commercial, a simple educational, and a simple community reuse.

This inference about the inefficiencies of up to 18 reuses is not biased by the estimated proportions of their assessed values in the numerators of their ratios of values. The 29 schools' percentage differences for their ratios were not correlated (at $\alpha < 0.05$) with their methods of reuse (where $-1 =$ simple, $0 =$ adaptive, $1 =$ redevelopment). Their methods of reuse were, in fact, only correlated (at $\alpha < 0.01$) with their classified types of reuse (where $0 =$ educational, institutional or community, $1 =$ housing or commercial; $r = 0.77$), and their number of changes in reuse ($r = 0.61$). These two correlations therefore corroborate the earlier inference about the variability within the types and timings of reuse. For example, the 10 housing redevelopments were never first reuses; they were not becoming more or less frequent as types of reuse; and their current values ranged widely from (−0.3)% to 181% higher than their former values. The percentage differences were therefore as unique as the deflated per-unit-area sale prices of the closed schools.

8.3. *Inferences about constrained ownership behaviors*

The individual pricing and disposal of each closed school may have produced their unique sale prices, and the volatile differences with their current values. This is the inference since two common ownership behaviors have not systematically constrained their pricing and disposal:

- (1) The percentage differences are not more or less efficient for a particular type and/or method of reuse, meaning that none had been mismanaged.
- (2) The sale prices and the percentage differences have no trend through time from the early closures and reuses to the later ones, when the school boards would have been gaining experience with private sales to reusers.

In particular, the dependent variables were not correlated (at $\alpha < 0.05$) with the dates of either their closure (where $-1 =$ before 1988, $0 =$ after that but before 1998, $1 =$ after that but before 2005; and $r = 0.08$ with the percentage differences), their first reuse ($0 =$ before 1990, $1 =$ after; $r = 0.10$) and current reuse ($0 =$ before 1995, $1 =$ after; $r = -0.03$); the durations between these dates ($r = 0.2$ and -0.1 , respectively); or the Public or Catholic separate school board as their original owner ($r = 0.1$).

9. Discussion and conclusions

9.1. *Contribution to policy*

As of late-2004, only three of 52 schools closed in Windsor since 1959 were vacant and for sale, and none of those had been disused for more than 4 years since their closure. Neither the disuse nor a time delay in the first reuse of closed schools has therefore been a problem for public policy. Similarly, non-problematic has been the reopening of 23 closed schools for public or private educational or ancillary use, or as a public community center or office building, or a park. All except two of these have retained their first type of reuse, and all except five are simple reuses.

Our speculation is that community residents will endorse those foregoing types of reuses that (1) are revealed during a closure review; (2) open without delay after closure; and/or (3) remain in place. For the organizations who bought the schools, such reuses will also save them from having to develop new sites with comparable new buildings.

In contrast, at least three of the housing, institutional and commercial reuses of the remaining 26 closed schools in Windsor have had land-use and neighborhood problems requiring a new decision by the Ontario Municipal Board (OMB) (e.g., [35,38]). However, as mentioned above, the OMB has subsequently published the regulations for the planned reuses of small disused urban sites. Private housing, institutional and commercial reuses will therefore be less problematic in the future, especially if they are the first and current reuses. In the past in Windsor, nine of 10 institutions were first and current reuses, as were two of three commercial reuses—though both of these are redevelopments.

Only two of 13 closed schools sold and reused for housing have realized that as their first reuse, while 10 of the total are redevelopments. These housing reuses were the most likely to be delayed after closure, and to be preceded by temporary uses. In other words, housing is an example of a past reuse (1) possibly known to a school board during a closure review, but (2) not evident to community residents. Therefore, our public policy recommendation is that school boards should be required to share information about the economic, social and environmental costs from a school's reopening and reuse—as is already done for any savings from its closure.

9.2. *Contribution to existing theory*

Eighteen of 29 closed schools sold in the private market in Windsor have been inefficiently reused regardless of their types of reuse. Their current assessed values were 19%-or-higher than their deflated sale prices. In two smaller groups, four efficiently reused closed schools had current assessed values just exceeding their deflated sale prices, while seven had sold at suboptimum higher prices than justified by their current reuses' property values.

A possible explanation of these inefficiencies is that the school boards have thus far priced and disposed of each closed school on an individual basis, such as if negotiating with one prospective buyer at one time. They have not yet rationalized their appraisal of closed schools as if in a market populated with many prospective new owners who have proven plans for, costs of, and profits from, types and methods of reuse. Despite this issue, they have neither mismanaged properties in a large landholding, nor got better or worse in selling their surplus properties in the private market place.

These, however, are tentative inferences about boards' past behaviors with closed schools due to two methodological limitations: (1) The historical sale prices from as early as 1980 were inflated or deflated with a national consumer price index for shelter costs. (2) The current values were prorated from a June-2004 property value assessment that lagged behind the reopening of at least half the schools. Finally, even if true in the past, the public and Catholic separate school boards may now more rationalize their sale and disposal of closed schools with subsequent experience in selling 14 and 15 of them, respectively.

9.3. *Future research*

Our suggested rationalization of the selling and disposal of closed schools so that they have equilibrium sale prices would certainly improve the predictive modeling of their reuses in future research Vs that achieved in

the current study. This approach would also help to resolve two previously mentioned research limitations: (1) The reassessed market values of properties may be recorded sooner following reuse; and (2) properties' new owners may better remember the proportions of new capital invested for construction and/or demolition of a closed school, and be more prepared to share such details.

We should note in concluding that an important research limitation remains: the number of closed schools with reuses for analysis will always constitute a small subtotal of the already-small number of closed facilities. The operationalized urban-economic development rule in Sections 2–4 of the current study will therefore be re-refined for measuring the effectiveness and timeliness of the reuse of brownfield industrial and commercial sites such as were mentioned in the Introduction, and previously studied by Munneke [23]. These further analyses should help clarify whether closed schools are special examples of small disused urban sites with their inefficiency of permanent reuse following a sale in the private land market.

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