

Building Better

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The Importance of Building Codes and Zoning Laws: A Case Study

By John Kiedrowski & Bud Jobin

For the past 15 years, Whitecap Dakota First Nation, in Saskatchewan, has been experiencing substantial economic growth. This has been part of the community's comprehensive economic development and sustainability plans. These plans included the building of the Dakota Dunes Golf Links Championship Golf Course in 2005, Dakota Dunes Casino and resort, and many other development projects. These projects are the result of 1,000 acres of reserve lands that have been zoned for commercial development. The development of businesses has also resulted in upgrading the existing infrastructure by building new roads and new water-treatment plants for commercial and industrial use.

This economic growth has also resulting in new homes being built in the community. WDFN is building several homes and residential apartment buildings. Approximately 400 members reside in the community and around 100 non-members are living with members or working in the community.

The objective of this case study is to further showcase how WDFN has introduced zoning and building-code requirements to construct residential and commercial buildings.

Impetus to Build to Codes and Introduce Zoning By-laws

In the late 1990s, under the leadership of Chief Darcy Bear and the newly elected councillors, there was a move to create and implement an Economic Development Plan and a Community Sustainability Plan. The combination ensured that the Chief and Council created and supported economic activity within their territories, and will sustain these activities over a period of time. These plans and related decisions have to be transparent and, best of all, independent and not connected to the timeframes of political mandates (e.g., elections). These plans were also developed to use existing resources and capacity in the community. If this is not possible, then there is a need to develop partnerships with others and to rely on professional expertise from outside the community.

To implement these two plans, access to capital and other investment was needed to develop the lands and construct buildings. To encourage investors, it was important for the Chief and Council to show their commitment by implementing by-laws and policies to clearly demonstrate that construction must comply with building codes, and that buildings will be situated in accordance with the land-use plan. The Chief and Council also wanted to exercise

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FNNBOA gets many requests, and resources may be limited. Priority will be given to those who contact FNNBOA first and provide the necessary supporting documents. If interested, please send an email to info@fnnboa.ca or contact Bud Jobin at (780) 523-8357.

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Eagle's Eye on Normal Operating Exhaust Capacity

One of the most significant technical changes to the new codes is the change in determining exhaust rates from using *room* counts to using *bedroom* counts. This decrease in capacity at first glance seems counterintuitive and at odds with industry standards such as CAN/CSA-F326-M, "Residential Mechanical Ventilation Systems." The F326 standard still applies when the bedroom count is over five, and is still referenced in most manufacturers' start-up procedures for ventilation equipment such as Heat Recovery Ventilators. For those inspectors who love interpreting code and reading the reasons behind code provisions, the new intent statements are a valuable resource when explaining code infractions to contractors. The explanatory material in the appendix is often dry, however, the explanation of bedroom counts in determining exhaust rates was informative and a good read. The following was extracted from the 2010 NBCC:

A-9.32.3. Heating-Season Mechanical Ventilation. For many years, houses were constructed without mechanical ventilation systems. They relied on natural air leakage through the building envelope for winter ventilation. However, houses have become progressively more airtight through the introduction of new products and practices, e.g. the substitution of panel sheathings, such as plywood and waferboard, for board sheathing, the replacement of paper-backed insulation batts with friction-fit batts and polyethylene film, improved caulking materials, and tighter windows and doors.

Following the energy crisis in the early 1970s, considerable emphasis was placed on reducing air leakage in order to conserve energy. Electric heating systems were encouraged and higher-efficiency furnaces were developed, which further reduced air-change rates in buildings. This led to concern that the natural air change in dwelling units might be insufficient in some instances to provide adequate indoor air quality. Condensation problems resulting from higher humidity levels were also a concern.

Evolution of NBC Ventilation Requirements

Mechanical ventilation requirements in the NBC have evolved from a simple requirement in the 1980 edition that exhaust fans be incorporated in electrically heated houses, through requirements in the 1985 and 1990 editions that all houses have mechanical ventilation systems capable of exchanging the indoor air for outdoor air at a specified rate: 0.5 air changes per hour in the 1985 edition and 0.3 air changes per hour in the 1990 edition.

The 1995 NBC addressed not only the overall air change rate created by the mechanical ventilation system but also the need to ensure that the outdoor air brought into the house by the system is distributed throughout the house.

Current Requirements

The current requirements are a further refinement. The ventilation systems described herein are essentially the same as those described in the 1995 NBC but

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their authority having jurisdiction, and understood that building and zoning by-laws were essential for a sustainable economic development strategy. Without building codes and zoning by-laws, they knew they would discourage the private sector from investing in the community. Codes and by-laws also give business a very good comfort level in knowing that building and zoning by-laws in place off reserve will also exist on reserve. Most importantly, by-laws cannot be easily revoked by future band councils.

Sustainable Economic Development

While the community realizes that commercial and housing stock are important to economic development, Chief and Council made several other decisions to build the foundation for a sustainable economic development strategy.

First, in 2003, the Chief and Council adopted the First Nations Land Management Act. This Act gives the Chief and Council the authority to make laws in relation to reserve lands, resources and the environment. The Act further gave the Chief and Council the authority to develop land codes. Consequently, in 2004, the Council developed a land-use plan, incorporating traditional agricultural use, and other areas that were best for economic development (e.g., golf course, commercial area or industrial parks). The plan divides the community into several sections. These include: residential small lot, residential large lot, community service/recreation, resort commercial, commercial/industrial, agricultural, special use and resource conservation.

In the same year, the Chief and Council introduced a property-tax by-law and system to provide fair and consistent taxation of commercial development. An independent consulting group is responsible for determining the value of the property in WDFN, following the rules determined by the Saskatchewan Assessment Management Agency (SAMA).

The Chief and Council further introduced a licensing by-law to control and monitor business activities in the community. This included businesses such as gas bars and convenient stores, and a home-based hair-styling business.

In 2004, WDFN also implemented a housing policy, and procedures. The objective of this policy is to provide the Chief and Council with guidelines in the administration of the housing and maintenance pro-

gram. The PWHC also includes design and construction standards where any residential building must comply with the National Building Code and other health, safety and construction standards. Home inspectors must inspect the site as well as conduct inspections during the building and renovation of the buildings. The PWHC also incorporates site standards where homes must be built on designated lots, in accordance with the WDFN Development Plan. Homes must also be located on the site to ensure they can be connected to the existing infrastructure (e.g., natural gas, sewer and water, roads, telephone, power). This avoids the situation where homes are located in a haphazard way on the building site, preventing further infrastructure development.

The WDFN Development Plan is strict in terms of the location of all buildings. Finally, the housing policy also provides a mechanism to ensure the householder complies with the policies, including eviction. As these policies are put in place, WDFN is moving forward to build new homes. During the next 10 years, the Council is planning to build on average 10 to 12 homes per year. They currently have 18 homes being built. The Council is also building a 12-unit residential building.

Moving Ahead

During the past several years, WDFN has implemented an economic development strategy that includes a golf course and casino. There is also a plan to build a hotel. As the Council moves to attract these commercial businesses, it is important that construction complies with the building code and other standards as established by the Public Works Department. This is to not only protect their long-term investment in housing stock, but also to attract capital investors. The construction of residential and commercial buildings follows the same compliance process. All buildings must comply with the land-use plan as well as the national building codes and other standards. Inspections are provided by a third party, off reserve. Over the next several months, WDFN will be developing an independent building-permit system. This will help to address homes being built by the Chief and Council and those members wanting to move back to the community and build their own home.

Whitecap Dakota First Nation has succeeded in incorporated the use of building codes and zoning by-laws into its economic strategies, to protect both investments and lands, and to encourage outside investors.

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additional provisions have been included with the following goals in mind:

- provisions that are easier to understand,
- reduced probability that outdoor air distributed through a forced-air heating system will be cool enough to cause premature deterioration of the furnace heat exchanger, and
- reduced probability that the ventilation system will cause excessive depressurization of the dwelling unit.

To some extent, the first of these goals conflicts with the other two and its achievement has suffered accordingly. Only in the manner of determining the capacity of the principal ventilation fan [see Sentence 9.32.3.3.(2)] has any significant simplification been achieved. See also Appendix Note A-9.32.3.3.(2).

9.32.3.3. Principal Ventilation System

2) The principal ventilation fan shall be capable of operating at an exhaust capacity complying with Table 9.32.3.3., referred to hereinafter as the “normal operating exhaust capacity.” (See Appendix A.)

The capacity of the principal ventilation fan is determined on the basis of the number of bedrooms in the house rather than on the basis of some fraction of the house volume, as in previous editions of the NBC. This is because the amount of ventilation required is related to the activities of people, and the number of people in the house is usually related to the number of bedrooms rather than to the size of the house. It should be emphasized that this air change rate refers to the installed capacity of the system, not to the rate of ventilation that is actually used in the house.

In many households, ventilating even at the background rate would provide more ventilation than required, resulting in unnecessarily high heating bills and perhaps excessively low indoor relative humidity. Thus, although a system with the minimum capacity must be installed, it can incorporate controls that allow the system to be used at less than its full capacity most of the time.

A maximum is set for the capacity of the principal ventilation fan because, if it were to be much larger than the ventilation needs of the household, it might never be used. The principal ventilation fan is intended to provide a relatively low level of ventilation such that it can be run continuously without too much noise and without serious energy penalty. If

Table 9.32.3.3.
Normal Operating Exhaust Capacity of Principal Ventilation Fan
 Forming Part of Sentence 9.32.3.3.(2)

Number of Bedrooms in <i>Dwelling Unit</i>	Normal Operating Exhaust Capacity of Principal Ventilation Fan, L/s	
	Minimum	Maximum
1	16	24
2	18	28
3	22	32
4	26	38
5	30	45
More than 5	System must comply with Clause 9.32.3.1.(1)(a)	

A-9.32.3.3.(2) Normal Operating Exhaust Capacity. The principal ventilation fan operates at a rate known as the “normal operating exhaust capacity.” This rate is intended to be suitable for use on a continuous basis at any time that an ongoing, background level of ventilation is needed, e.g. the late fall or early spring when air leakage driven by wind and inside/outside temperature differences is lowest but it is too cold to rely on open windows.

the installed capacity exceeds the minimum by a large margin and the fan flow cannot be reduced, there is increased probability that the fan will not be used at all, thus defeating the purpose of having it in the first place. Sentence 9.32.3.3.(2) therefore places limits on oversizing.