

K.H. DAVIS ENGINEERING CONSULTANTS LTD
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Client info sheet on Home Additions and Structural Services

If you are planning to build an addition to a home, then it is important to understand the overall process which needs to be followed to ensure that your project moves forward smoothly and in a timely manner.

This information sheet is intended to assist prospective clients in the overall process so that they can understand what to expect during the design and approval process, and what to expect from your home designer and/or structural engineer. It is important to be knowledgeable about the qualifications of the home designer that you choose to hire.

If you are thinking about designing your addition yourself, then this information will also help you understand the overall process that you should follow.

Who can design my home addition?

In Ontario, renovations and additions to a home can be designed by a variety of qualified professionals which may include Architects, Designers, Engineers, Contractors (design-builders) Technologists, and Technicians. In fact, even a Homeowner can prepare their own design drawings (as long as the design is for their own home) and then apply for a building permit, provided that the home conforms to the size limitation of Part 9 of the Ontario Building Code (Footprint of house may not exceed about 6000 square feet, up to 3 Stories in height).

Since the skill levels and abilities of home designers varies tremendously, the Province of Ontario decided in 2006 to enact Bill 124 which set up various regulations regarding the qualifications of "Designers" who can design homes for clients and also submit those designs to municipalities for building permit applications.

Effective January 1, 2006, the" Ontario Building Code Act" was amended through BILL 124 to require those persons who provide advice and/or design work for projects that require a building permit be qualified to "Ministry of Municipal Affairs and Housing" standards. These persons are required to take a certification course and exam to obtain what is known as a BCIN Number. This can be any project from a deck to a pole barn to a complete housing package.
Persons having a BCIN Number must also carry errors and omissions insurance to protect their clients in the event of a problem with their design.

Note that Licensed Architects and Professional Engineers are exempt from the requirements of BILL 124 since the practice of Architecture and Engineering is already regulated under the Architects Act and the Engineers Act; Architects and Engineers do not require a BCIN Number to offer services to the Public.

Professional Engineers Ontario

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The Design Process:

In a broad sense, the overall process that needs to be followed in order to obtain a building permit for an addition or significant change to the exterior of a home involves the following steps:

1. **Preliminary Design** – This is when the overall concept design for your project is formally prepared. During this phase, the size, shape, and functional layout of the design are established by preparing basic design drawings. Some projects are very simple and do not require extensive preliminary design since the extent of the addition has already been established even before the design process starts. Nevertheless, documenting exactly what is proposed is a very important first step so that the rest of the process can accurately build upon the preliminary design.
2. **Zoning Review with the Municipality** – During this critical initial phase, design plans are formally submitted to the municipality for applicable law review (zoning review). During this review, City Planners will review the design for zoning by-law compliance. ***It is very important to carry out this review prior to proceeding with detailed design for the project since conceptual design changes may need to be made if a component of your project does not conform to the local zoning by-law for your neighborhood. Many designers fail to carry out this step and create much confusion and disappointment for their clients late in the design process.*** Zoning review should always be done through a formal application process since zoning by-laws are complex and are best understood by the Municipalities staff planners. Examples of zoning regulations which must be followed would include maximum allowable height restrictions, minimum side yard setbacks, maximum allowable square footage, maximum allowable lot coverage, etc. It is possible to obtain permission to build a project which does not comply with a zoning by-law; in this case, a variance is required from the Committee of Adjustment. Variances typically take about 4-5 months to obtain from start to finish. Note that Zoning Compliance has nothing to do with Building Code Compliance. Most municipalities require a project to go through zoning review before you can apply for a building permit, however some may allow the process to take place in parallel. A building permit will not be issued for a project which does not comply with current zoning by-laws, so there is no point on proceeding with a full design if zoning review has not been completed first.
    a. **Applying for a Variance** – If your project does ***not*** comply with zoning, then you need to either change your initial design to comply with the zoning by-laws, or, try to obtain a variance from the Committee of Adjustment to allow an exception for your specific project. The Committee of Adjustment Process is time consuming and is not always successful. Even if your neighbor already has exactly what you have, this is no "guarantee" that you will also be able to obtain permission to build the same thing. The Committee of Adjustment is a panel of persons appointed by City Council to review applications for variances. The application process is a public process; your neighbor's will be solicited for comments (by mail) regarding your proposed variance and they are entitled to voice their opinions about the proposed variance, however favorable or unfavorable their opinion may be.
3. **Detailed Design** – Once all zoning issues have been dealt with, the project can move ahead into the Detailed Design Phase. At the start of this phase, the "big picture" items are all decided and then the many small details of your project are specified and designed. Drawings showing the final layout complete with dimensions and exterior elevation views are prepared in detail and checked for compliance with the Ontario Building Code. Once the aesthetic and functional design has been completed, we will ask you to "sign-off" on the final layout to confirm that what we have drawn is what you want to build.
4. **Structural Design** – One of the last things to do before the design is finalized is the structural design. During this phase, the size of the beams, posts, floor joists, foundation walls and footings is determined by a structural engineer. Once the structural design is complete, the plans are made ready for permit application. Most municipalities require at least 2 full sets of design plans to be submitted

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as part of a permit application, and many municipalities also require that the plans be submitted in a digital format for archiving purposes.

5. **Building Permit Application and Approval** – During this phase, the building permit application is made. This is a straightforward procedural task which involves filling out the application form and submitting it to the Municipality. Fees for the building permit are also usually levied at the time of permit application, and most municipalities have a published schedule of fees which are usually dependent upon the type of work and not necessarily dependent upon the value of the construction project. The Permit application can be done by the Owner themselves or by the Designer. Most applications for a building permit should take only about 10 business days to process (actually, under Bill 124, a municipality is supposed to either accept or reject a permit application), however sometimes a longer period is needed if the permit application is not considered a complete application.

Other Permits that you will likely need:

1. **Plumbing:** In most municipalities, a plumbing permit is, upon request, issued along with a Building Permit. To obtain a plumbing permit, it is often only necessary to complete a form which lists the number of plumbing fixtures which are to be installed as part of the proposed work. Some municipalities require more extensive design which documents a drainage system more thoroughly. Examples would include the installation of a septic system, installation of drains which receive storm water (rain water runoff) discharge from a roof, sunken basement walkout, or other paved area which must be drained.

2. **Mechanical (Heating and Air Conditioning):** If you are building an addition, then you must also heat it, and the municipality will want you to submit an HVAC (Heating, Ventilation, Air Conditioning) Plan showing the size and layout of the heating system, complete with "heat loss calculations" prepared by a qualified HVAC designer. In many home additions and renovations the HVAC permit is obtained by the heating sub-contractor directly who is going to supply and install the new heating system (or modify the existing one) for the project, and the individual who prepares the building permit plans may not have much to do with this part of the construction project.

   Most new residential heating systems are forced air gas heating systems, however many older homes are heated with hot water (hydronic) heating system which consist of a boilers and radiators located throughout the home. Modern hydronic heating systems often have much smaller boilers and radiators, combined with areas of heated floors (often called "in-floor radiant heating").

   In many cases, it is important to plan the HVAC system with the design of the project, so that heating ducts and floor systems can be designed to accommodate the type of heating system which is to be used.

   Radiant Heating: Radiant heating has become very popular due to the very comfortable heat that can be provided through in-floor radiant heating. The Ontario Building Code requires that new homes be equipped with mechanical ventilation (i.e.: ventilation which involves moving the air in the home) and for this reason, a new home with radiant heating, and often a home undergoing a major renovation, also must have a Heat Recovery Ventilator or "HRV" unit which exchanges the interior air with the exterior air at a certain rate. HRV units often utilize a small diameter air duct which is easy to distribute throughout a new home and does not require bulky heating ducts as does a forced air heating system.

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3. Electrical

Electrical permits are obtained directly by the Licensed Electrician that works on your home – electrical is under the Electrical Safety Authority (ESA) and is not part of your municipal building permit application – for this reason, we do not provide any electrical design services for most home project.

However, lighting design is an important component of the finishing of your home – you will want to ensure that appropriate lighting, electrical receptacles, switches, and the like, are planned in advance of dry-walling during construction. We can provide design assistance in this regard, or, you can work with an interior designer or your electrical contractor, to help with this aspect of your project.

Please note that unless electrical line diagrams are included as a separate design fee line item in your proposal, it is not included.

How much does it cost to design my addition?

Once you meet with your designer, they should provide you with a detailed proposal for services. Our firm charges a fixed fee for design services up to and including the point at which you obtain a building permit, however many firms charge their time on an hourly basis.

Typical design fees for the design of an addition to a home would be between $9,000 to 18,000, depending upon the complexity of the project, including structural engineering. Some full-service architectural firms charge considerably more, so it is important to understand precisely what you are getting in terms of services, level of detail, etc. Note that some companies do not include structural engineering as part of their design fees, but instead charge this out as a disbursement which is payable by the Owner near the end of the project. Make sure that you know whether or not the proposal for design services that you receive from others includes structural engineering if you are comparing our service to those of another firm. Also note that the designer of your project (and engineer) may also need to carry out site visits during construction to inspect the progress of the work. Site visits during construction are charged on a per-site-visit basis and are extra to the design fees since we never know to what extent we will be asked to inspect by the City Inspector. Sometimes, an inexperienced contractor will make mistakes during construction and in such instances, we may need to attend the site more times than usual – unfortunately this cost must be borne by either yourself or by your contractor.

Unusual Additions:

Adding living area inside what is currently an Attic: Often attic spaces are to be converted into living spaces – these qualify as "additions" to your home and as such, a zoning review is always necessary to determine whether or not you will need a minor variance to add the extra living space. We design many such additions and we provide all required design services. As part of our work, we will need to verify that the foundation walls can handle the extra load of the addition, and we also must usually design a new floor system for the former attic space, since floor joists in most attic spaces would not comply with current building code requirements for a living space. When designing attic additions or new 2nd or 3rd story additions, the weight of the new floor area is usually transferred to the exterior walls of the home by spanning the full width of the house with engineered floor joists – this way, existing beams, posts, and pier footings on the interior of the original home are not affected by the addition.

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Creating living space below a porch or a kitchen:
If you are planning a new living space below a porch or kitchen area that presently is not enclosed with a full foundation wall, then entirely new construction below these areas needs to be carried out – this means that, even though you may have an above-grade living space above the area of proposed work, the new construction below must still comply with local zoning by-laws, and in some cases the new construction does not comply with the minimum property line setbacks. This is common in older homes - an example is when a homeowner wants to create a living space below a front porch area which is currently just a deck supported on brick pillars. The existing deck and pillars were likely constructed before the zoning by-law came into effect (and are therefore an existing non-conforming construction which is "grandfathered") but often the new foundation wall construction which is now required below the front porch is too close to the front or side yard property lines and will require a "variance" from the Committee of Adjustment before a permit application can be made.

There are many similar variations on the above noted scenario – so make sure that you ensure zoning compliance before you spend good money on design services!

Extending a Porch or Deck:
If you porch or deck is less than 2' (600mm) above grade, then it is likely considered only "landscaping" and may not require a permit. Otherwise, porches and decks must be properly designed and permitted by the municipality, and the construction must comply with local zoning by-laws and the Ontario Building Code.

Building a Garage:
Many old garages off-of lanes behind houses are run down and can be permitted for re-constructed fairly easily. In most areas, it is easy to obtain permission for this sort of work. However, new garages on properties that formerly did not have a garage must, again, be reviewed for zoning compliance. Also, if the garage requires a new curb-cut and driveway, other agencies may need to be consulted for approval, such as City Forestry and City Transportation Services; in some cases, this can be a complex project.

Building Close to a Ravine:
Construction near ravines is often controlled by Regional Conservation Authorities. If you know that your project is close-to or on a ravine controlled area, then part of the overall process to get a building permit will entail applications with the local Conservation Authority; in our experience, approvals from conservation authorities is slow and tedious process, and considerable time and effort is needed by the designer on projects such as this. We have designed many projects in ravine areas, and oftentimes site-specific structural design details are needed which involve the use of helical piles and grade beams. Construction plans showing how sediment will be controlled is often also needed.

Building on top of a river, swamp, or area which has been "in-filled":
It is very important that, prior to any new construction, that a soil engineer attend the site to confirm that the native soil is adequate to support the structure. Often, soil that has been previously disturbed is not evident to a contractor and for this reason, one must not rely upon a non-professional to verify soil conditions on a site. Usually design plans will require that footings be placed on "naturally consolidated undisturbed soil having an SLS bearing capacity of at least 75kPa." If these conditions are not verified at the beginning of construction, there can be very significant problems with the house in the future, such as foundation settlement, cracks, sloping floors, and the like. In some cases, special venting pipes must be installed below houses which are built on organic soil deposits, and the foundations may need to be placed on piles which transfer the weight of the house onto soils which are far below the basement level of the house.

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Please call us!

If you would like for us to help you with your renovation project, please call us and we can provide a quotation for the preparation of detailed design drawings that you will need to apply for and obtain a building permit from your municipality.

Good luck!

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