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Consumers looking to hire a concrete contractor are invited to use this document as a guideline to define expectations of the property owner and understand the expectations of the contractor. The following points are considerations to be noted prior to beginning concrete construction. These considerations and concrete industry standards should be included into a written agreement for work or job document.

There are six steps involved to properly place new concrete. See "Six Steps to Properly Prepare and Place Exterior Concrete" separate from this document @ www.vandervart.com

- **Start date:** Document the anticipated start date. Construction schedules are affected by weather conditions therefore being within 2 weeks of an anticipated date is usually considered acceptable. If an exact start date is an important part of the project, it should be noted in writing and agreed upon by both the property owner and the contractor.
- **Completion date:** Document the anticipated completion date. Construction schedules are affected by weather conditions therefore completion dates may need to be altered. If an exact completion date is an important part of the project, the completion date should be noted and agreed upon in writing by both the property owner and the contractor.
- **Permit and locates:** Will a building permit be required? Document in writing who is responsible to obtain the permit and who will pay any associated fee. Will an inspection be needed? Who will call for an underground utility locate? Property owners are responsible to inform contractors in writing of anything buried underground prior to the start of work. Overhead wires should be noted and flagged if applicable or as needed.
- **Concrete construction** will likely include excavation, removal, new fill material and a crew of workers at the worksite. The property owner should expect noise from equipment, trucks and labor. Moving concrete and using equipment usually includes some damage or alterations to the existing landscape. Are there important areas that should be protected from construction traffic? Define entry access points and transit routes prior to beginning the work. Will a concrete truck be operated beyond the street and onto the private property? Both parties should be aware that some work may need to be completed after the concrete work is completed. Define who is responsible for remediation and landscape work after the concrete work is completed.
- **Base preparation:** All top soil and loose dirt should be removed from the area that concrete will be placed. The subgrade should be made a consistent depth of a compacted material such as road gravel. The finished subgrade should be representative of the finished slab with appropriate pitch.
- **Under slab Utilities:** Discussion with the property owner should include consideration of placing utilities under the concrete. Is there a need for a power line to be installed under the concrete? Rain gutter downspouts may need to be trenched under the concrete. Water sprinkler systems are much easier to install before new concrete is placed. No utility line or conduit should be inserted into the concrete, but always under the concrete slab. Define any under slab utilities with installation in the written job document.
- **Design:** Exterior concrete slabs placed in Wisconsin should be placed with $\frac{1}{4}$ " of pitch per foot or 1" in 4 feet. If the concrete will be placed with less than $\frac{1}{4}$ " per foot, the contract document should contain such verbiage with a responsibility clause noted. Surface defects or surface failures may occur with less than $\frac{1}{4}$ " of pitch on exterior concrete. All exterior concrete should be placed at a minimum of 4" thick. Parking lots or driveway approach slabs are usually a minimum of 5" thick. The thickness of the concrete is a very important part of the design process. Document the thickness of new concrete in the written job document.

- Concrete mix: The American Concrete Institute [ACI] recommends concrete that is placed exterior in the State of Wisconsin, be of a compressive strength of 4500 psi @ 28 days, with approximately 6% air content and a maximum water/cementitious ratio of .45
 1. Consider a low chert stone option. If decorative concrete will be placed, a low chert mix is recommended. Concrete contractors should have a discussion of the customers' expectations that may include low chert mix.
 2. Colored, stamped or decorative concrete should be defined by color and texture.
 3. Broomed concrete surfaces should be defined in the work agreement.
- Reinforcement: Most exterior concrete should include reinforcement. Three reinforcement products are common. Each of these products have specific application benefits that should be considered. Each of the three has a specific objective or use and in some cases, two types of reinforcement are used in the same placement:
 1. Wire mesh
 2. Fibers
 3. Rebar
- Concrete placement: Concrete should be unloaded from the truck and properly placed within 90 minutes from the time the truck was loaded. Place the concrete with as little handling as possible to avoid segregation or a change in the mix proportions. The screeding process is followed immediately by bull floating. Never spray water on the surface of the fresh concrete and do not work bleed water back into the concrete surface. Do not use steel trowels on exterior concrete slabs. Protect the concrete from temperature extremes in weather including wind.
- Control Joints: Control joints are placed in the concrete to control the cracking that is typical with fresh concrete. The contractor should define the method of placing control joints in the concrete and note the location or spacing of the joints.
- Curing: The contractor should define the curing process that will be used to protect and ensure the consistent strength gain of the fresh concrete. Will a liquid cure and seal compound be applied? If yes, define the brand and name to the owner in writing so that future work can be performed with a compatible product.
- Clean and seal the concrete after 30 days. Define who will be responsible for this work and document the sealer that will be compatible with the curing process. The concrete should be cleaned and resealed in future years. The time frame will vary with the type and volume of traffic on the concrete and the type of sealer applied. Concrete is a significant investment – take care of it and it will perform for decades.
- Payment terms: Define a downpayment, start work payment and completion of work payment. How will extras be documented and how will extras be paid?
- Warranty: If there is a warranty on the product and/or labor, it should be in writing with both party's signature. All considerations or exceptions should be in writing.
- Chemicals: Avoid calcium chloride and de-icing compounds - especially the first year. Never use chemicals that contain ammonium sulphate, ammonium nitrate or magnesium chloride. These chemicals cause stress to the concrete and can lead to surface defects even if the concrete was properly placed, cured and sealed. Do not allow lawn fertilizers to lay on the concrete surface. These materials can cause stains or result in damage to the surface of the concrete.
- Concrete is manufactured with natural materials that include some inherent flaws and inconsistencies. Some variations in color and texture as well as minor surface imperfections are to be expected. Weather conditions affect the color of concrete. High humidity or high moisture in the air will usually result in a lighter color concrete surface, and the contrary is also true. If the project will span multiple concrete placement dates, concrete color variation should be discussed.