

DIY Fiberglass Pools!

SOLUTIONS FOR SLOPED YARDS

By Jason Hughes

If you're reading this, there's a good chance your backyard presents some challenges. The goal of this guide is to help you better understand the options you have available to you when installing a pool in a sloped yard.

By and large, sloped lots present more challenges to customers and contractors alike than any other part of a pool project. Customers have a hard time visualizing the completed project and contractors must determine the most effective method of managing the slope while working within the confines of their customer's budget.

Visualization is such a challenge for most people because they recognize their yard isn't level but they can't picture the finished product. To make matters worse many pool contractors mistakenly assume that they know their client's expectations without making the finished yard a point of discussion. As a result, many people enter into a pool project with wishful thinking and trust that their contractor will produce something that looks "good"....whatever that means.

Don't settle for wishful thinking. If you are uncertain about the final result, ask questions or do whatever it takes to get clarity. The good news is it doesn't have to be that difficult. Managing a sloping lot is nothing more than the process of planning and building a transition from a higher area of a yard to a lower one. This chapter will provide you with a basic knowledge of the methods used to manage yard slope, what materials are most commonly used in these processes, and an overview of the various types of slopes. This foundation will enable you to speak intelligently with your contractor about the issue or possibly even determine the best method of managing your site for yourself. First, let's take a look at the methods used to deal with a sloping yard.

There are two fundamental ways of managing any sloping yard: retaining walls or site work.

Retaining walls are structural entities built of solid materials for the purpose of holding back material from an area of higher to lower elevation. They are constructed of various materials like interlocking block, stone, brick, or lumber.

Site work, on the other hand, consists of cutting down or building up earth to achieve an acceptable degree of slope away from the house or pool. This new slope or grade can be managed by planting

grass or using ground cover like mulch or decorative gravel. Let's take a look at each of these alternatives to see which might work best for you.

Retaining Walls

Retaining walls are common features in many landscapes. They are frequently used around homes and businesses and are built of a wide variety of materials. In this section we will discuss some important facts about retaining walls as well as the most common materials used in their construction.

Important general information about retaining walls:

- Most walls over 48" tall require an engineered set of plans to build, so try to stay under this height whenever possible.
- Most areas require a railing for walls over 30" above ground level. If the wall height is over 30" various methods can be utilized to offset the need for a rail. This will be discussed later.
- Most areas also require a handrail if you have more than two consecutive steps leading from a wall, terrace, or deck.
- Retaining walls are measured in units of square face feet (length x height)
- For structural purposes most wall designs call for the bottom course of block to be completely buried in the ground. So don't forget to factor that into your estimates if you're calculating wall size.

A Brief Overview of Retaining Wall Materials:

Interlocking/Segmented Concrete Block

Over the past 5-10 years segmented walls have become the dominant retaining wall material used around swimming pools in most areas. Installation is relatively simple and most people find them attractive. The height of these walls range from six inches to sixty feet tall, and they come in a wide variety of sizes, shapes, and colors. Construction consists of dry stacking the individual blocks together to create one interlocked segment of wall. Prices usually range from \$40-\$65 per square face foot depending on material selection and location.

Advantages:

- Good for construction in tight quarters and in limited access sites because of ease of handling and transporting the individual blocks.
- Can easily be built to follow any free form pool or patio

Disadvantages:

- Requires "geo-grid". A product that keeps the wall from falling forward by tying back into the hill side. This usually extends into the backfilled area a distance equal to the height of the wall. So if you have a 6' wall, the "geo-grid" would extend back from the wall 6'. This is a problem if the pool on this side of the wall is only 4' away.

- From a design perspective, it necessitates the need for yet another type of material to pick out. You need another choice to make, right?



Interlocking concrete block retaining wall

Natural Stone or Brick on Cinder Block

This is your standard block and mortar wall on a concrete footing. This type of wall is reinforced with rebar and by filling the block with grout or concrete. The beauty of this type of structure is that you get to choose the venire. Natural stone, brick, or simple parging (coating with mortar) are common finishes of these walls. The cap, or top of these walls are usually made of the same stone or brick or can be constructed of poured concrete like demonstrated in the illustration below. Construction typically takes longer with this type of wall because of the detail oriented nature of the work, so the price is usually a little higher than a segmented block wall. \$35-\$60 per square face foot is common.

Advantages:

- They afford wide design opportunities as you can customize the venire to meet your needs.
- No “geo-grid” or tie-back required as all stability comes from within the wall (in most cases).

Disadvantages:

- Price per sq ft tends to increase with free form designs.
- Pouring the concrete footing is a challenge and expensive on sites with limited access.



Natural stone retaining wall with concrete cap

Turndown Slab/Monolithic Pour

Imagine a yard that gently slopes downhill and a concrete slab that continues to stay level and gets thicker and thicker as it moves out into the yard. On the high side of the yard the slab is 4" thick, and on the low side it's 12" thick, or however much the yard sloped in that distance. This is a turndown slab. In my opinion this is the most underutilized method of dealing with minor slopes ranging from 12"-24". If you're getting a concrete patio anyway, why not take care of everything in one shot? Compared to other options it's quick, relatively inexpensive, and looks especially good with stamped concrete because the side of the concrete can be textured. Prices will vary dramatically but expect something in the range of \$18-\$25 per square face foot.

Advantages:

- Blends seamlessly with patio because it is the patio
- Eliminates chance of ground settling under concrete if done properly
- Can curve to follow any pool or patio design

Disadvantages:

- Not as effective an option for heights over 24" (typically).
- Not an option for paver patios

- When done with broom finish concrete this method can look a little drab, but can easily be dressed up with landscaping.



This illustration of a turndown slab shows how the thickness of the pool deck increases in height as the yard slopes downhill from the house. This turndown slab is approximately 14" tall.

Poured Concrete Walls

Poured concrete walls are built by setting wall forms in place then filling them with concrete. This is completed in lifts to insure the concrete is properly consolidated. The forms are then stripped and viola...a wall. Some forms are designed to make the concrete look like brick or stone; some are flat surfaces that you can leave "as is" or face with real stone or brick. This option is usually best left to contractors and typically not the best alternative for smaller walls (36" or less) because of the high set up cost of the wall forms. For larger walls the price is usually equal to, or slightly higher than, the cost of a plain cinder block wall. The difference between a poured concrete wall and a turndown slab is that the poured wall, unlike the turndown, is free standing and not connected with the patio.

Advantages:

- Great for taller straight walls in tight quarters because they do not require any "tie-back".
- Great when incorporating steps into the wall because they can be constructed of poured concrete as well.

Disadvantages:

- Usually more expensive to build free form designs, if possible at all (depending on contractor).
- Very expensive to build in restricted access lots because of difficulty in getting concrete to the site.



Poured concrete wall with recessed concrete steps

Wood

The most budget friendly of all retaining wall options. Wood walls can be constructed of 6x6's, railroad ties, landscaped timbers, or literally any type of treated lumber. If these walls are over a height of 18"-24" they usually require some form of "tie-back" into the hill side.

Advantages:

- Can beautify any area when combined with planting beds or elevated to make bench seats.
- Can satisfy the needs of a tight budget when all of the other extra expenses are adding up.

Disadvantages:

- Limited to straight runs with angles.



Wood retaining wall built of 6x6 pressure treated lumber

Some other types of walls are:

- Dry Stacked Stone- commonly used for smaller free standing walls around landscaping, etc. An easy diy project.
- Mortared Stacked Stone- used for smaller walls and can be built of literally any type of stone.

Now that we've looked at the most popular retaining wall materials, let's take a look at another critical feature of any retaining wall design: steps. The following illustrations show the three most common step configurations.

Types of Retaining Wall Steps:

Straight External:



Straight external steps are most common and least expensive type of steps to build with retaining wall block.

Wedding Cake Steps:



Wedding Cake style steps add class and beauty to almost any setting. The amount of labor required to construct this configuration makes them more expensive than straight external steps.

Recessed Steps:



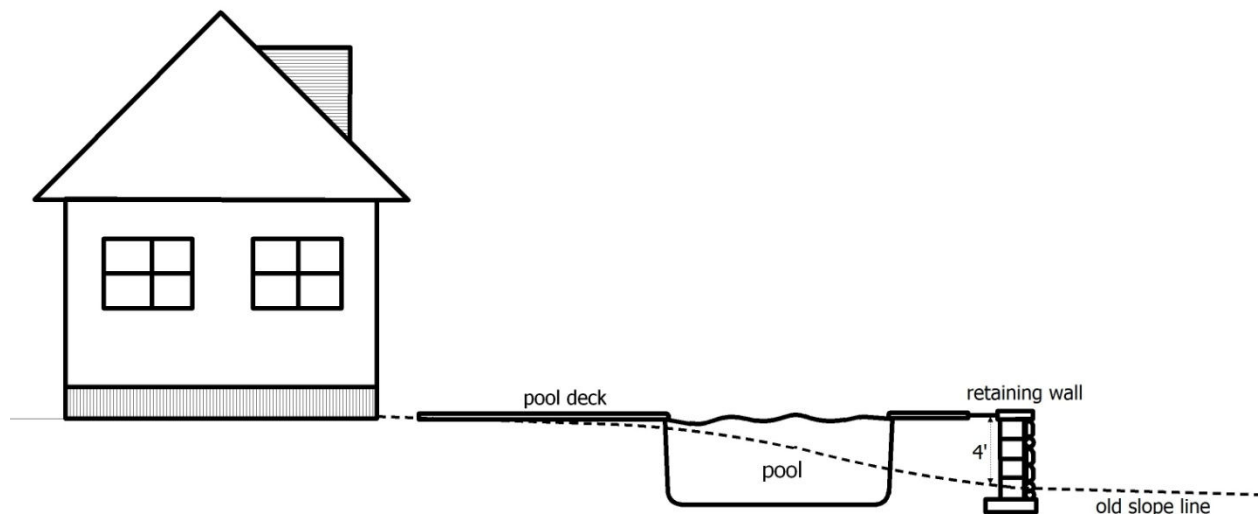
Recessed steps have several advantages. They do not extend beyond the outside of the wall and therefore allow for unobstructed traffic around the lower level. The “built in” look of the steps is also very appealing to the eye, and gives a feeling of integration and permanence. Two disadvantages are that they are the most expensive to build, and they can increase the distance required from the pool to the wall because of the space needed for the steps.

Another important design function with retaining walls is the transition from the wall to the pool patio. Notice in the above pictures that there is a space between the retaining wall and the pool deck with the exception of the area connected to the steps. This serves several fundamental purposes. First, it provides a buffer to keep people a safe distance from the edge of the wall. Remember, in most areas you can be 30” above grade without a railing, so building in cues to alert people of a change in elevation is a good idea. Second, the open space allows water from the pool deck to filter down to the wall’s drainage system that was installed behind the wall during construction. This keeps water from running down the face of the wall which can result in stains, discoloration, or mildew. Third, the space allows area for a landscaping which will break up the cold transition from pool deck to wall block and give a softer and more attractive look. This gap between the wall and patio can be as wide as you like, but keep in mind that as the width of the project increases so does the size and cost of your wall.

Different Wall Configurations

Any site requiring a retaining wall begs the question: Where do I put the wall? Let’s look at a few options.

Option 1: Building up and putting the wall in the back:



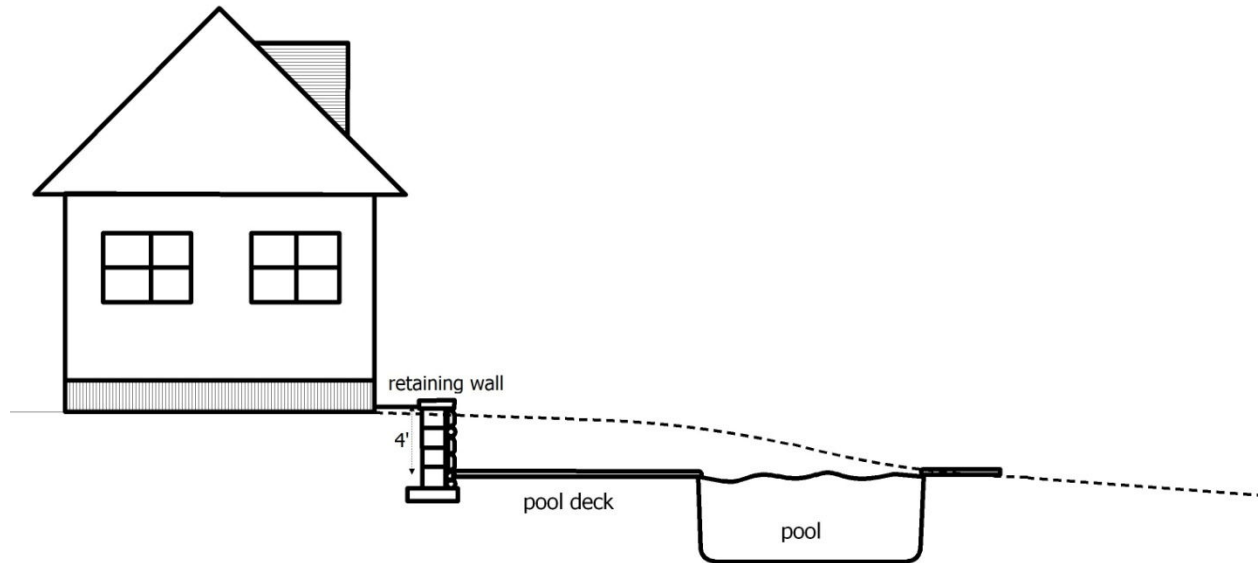
Advantages:

- You can walk straight out onto pool deck from the house
- The top of wall can provide great place to install fence if your plan is to fence directly around the pool.

Disadvantages:

- If wall is over 30" tall it will require a railing which is a view obstructer.
- Cost of gravel, or other material, to backfill between wall and pool can be very expensive.

Option 2: Cutting down and putting the wall in the front:



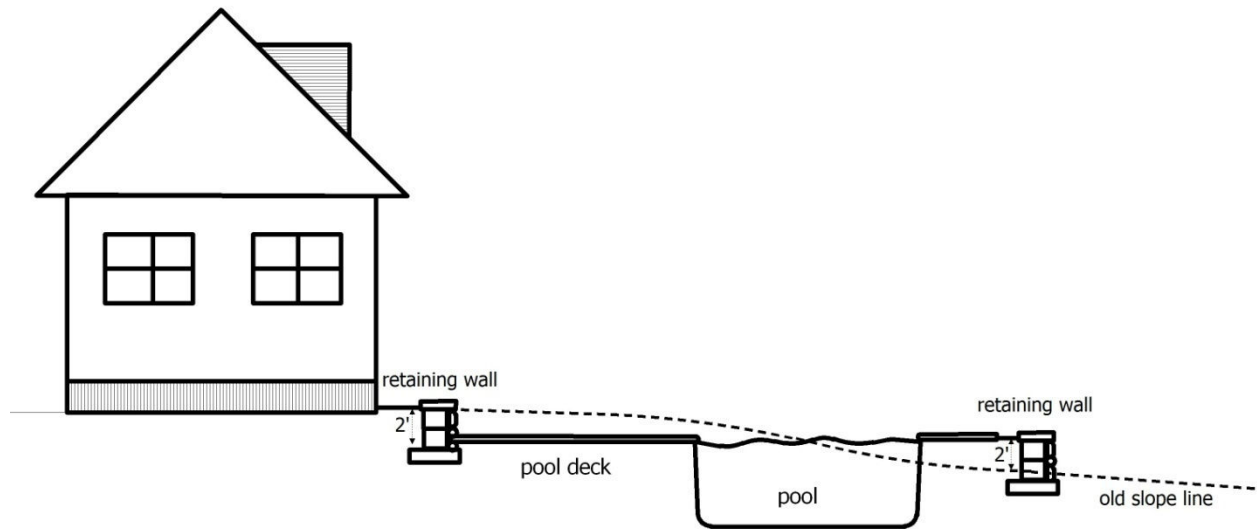
Advantages:

- Great view of pool from house.
- You have an opportunity to incorporate a majestic set of steps from the house leading down to the pool deck.

Disadvantages:

- Those steps come with a price tag.
- Drainage required at the base of the wall on pool side
- Creating potential need for a railing and handrail.

Option 3: Splitting the difference:



Advantages:

- No railing or handrail required
- No feeling of containment by a taller wall.
- Less site work required.

Disadvantages:

- Multiple walls are more expensive for two reasons. First, each requires a course of block buried in the ground which increases your square footage. And second, because each requires its own footing your labor cost is more than with a single wall.

Two last points on retaining walls. When you have a wall higher than 30" and you want to avoid the need for a railing, consider terracing the wall. This can be pricey, but it's well worth the effort if it allows you to maintain a spectacular view. Terracing is essentially building a double wall; first, the primary wall that's higher than 30", then a shorter second wall built two or three feet away from it that reduces the height discrepancy to less than the required amount. Fill the gap between the two walls with landscaping, make sure your secondary wall is not higher than 30", and you've eliminated the need for a railing. If that doesn't work for you, consider backfilling against the backside of the wall so that less than 30" of it is exposed. That'll make Mr. Inspector happy also.

If you have more than two steps and want to eliminate the need for a handrail, consider building a series of landings instead of steps. Normal step treads are 10"-14" wide. Try making each step its own separate landing, say 48" wide or better. If you have the room this will make for a grand entry point and also rid you of the unwanted handrail. Don't forget our 30" rule. This won't fly if these landings are too far off the ground.

As you know, sometimes the use of retaining walls is inevitable. However, there are many instances when just simply cutting down or building up an area with earth will do the trick. Let's look at site work as an option for dealing with sloping terrain.

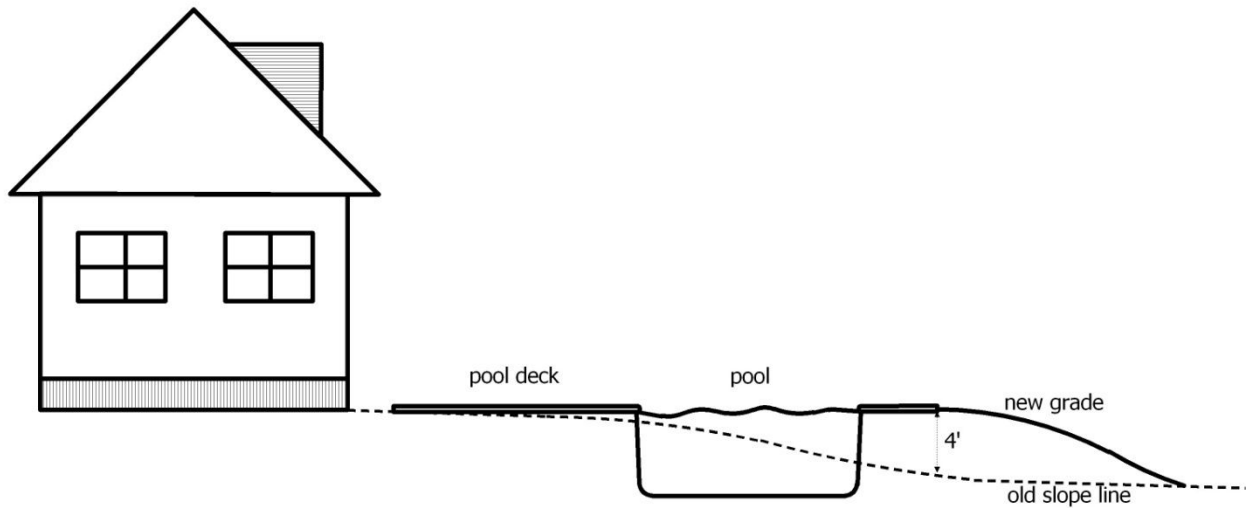
Site Work

Site work simply consists of using earth to achieve an acceptable transition from a higher to a lower area of a site. This is commonly referred to as cutting and filling. This method is typically very cost effective and can be used to eliminate the need for a retaining wall. Let's take a look at a couple of ways to utilize site work as a means of dealing with a sloping yard.



In this case the yard has a slope that falls about four feet from the back of the house to where the opposite side of the pool will be. Let's look at two ways of managing this slope using site work.

Option 1: Building up on the low side:

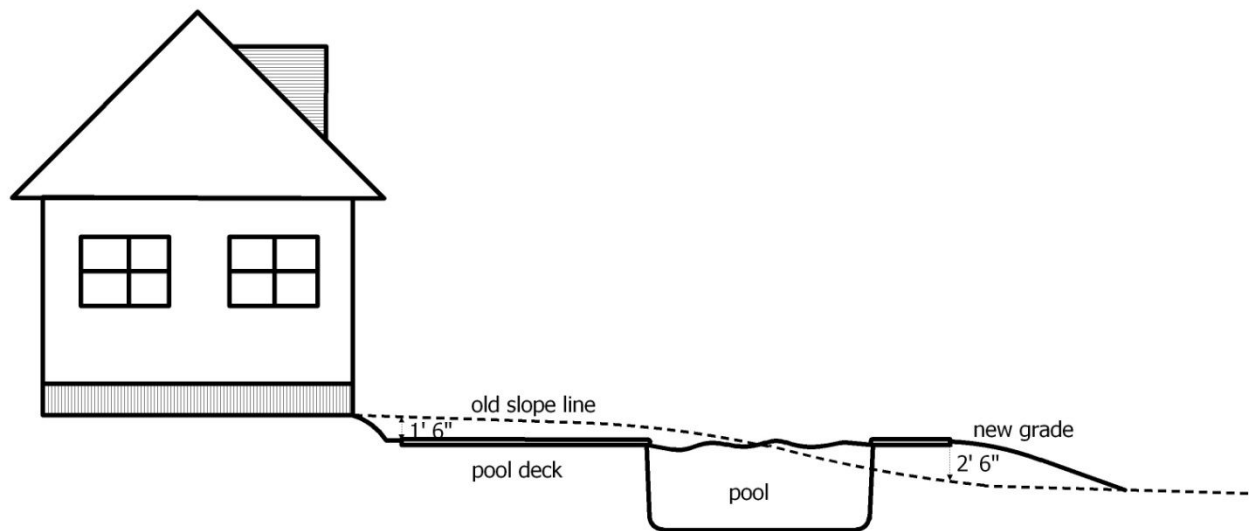


As you can see in this diagram, the pool is set level with the grade at the house. The far side of the pool was built up approximately four feet. In cases such as this, two factors have a great impact on the amount of dirt required to achieve an acceptable degree of slope:

1. the distance the patio extends into the yard.
2. The amount of flat ground around the outside of the patio before it begins to slope off.

Two great ways to spend what I call "invisible money" are to add patio to the downhill side of the yard, or to attempt to make a sloped yard flat. You'll spend much of your hard earned money on dirt and get nothing in return. Try to work with your yard not against it. In my estimation, this site would require multiple loads of dirt to achieve the slope that's illustrated, however this approach does a fair job of working with the yard. But in my opinion there's a better option.

Option 2: Splitting the difference:



In this case, the pool and pool deck were set lower than the house in order to reduce the amount of build up on the far side. This approach works well for several reasons:

1. It minimizes the degree of slope on the far side which makes it easier to maintain and requires less dirt.
2. It lowers the pool and allows for a better perspective from the house.
3. The sloped earth at the house serves as an elevated planting area which can break up the monotony of a plain pool deck.

However, this method does require some additional work. A 12"x12" gravel infiltration trench needs to be installed at the perimeter of the patio on the house side. Encased in the gravel is a 4" piece of perforated plastic pipe running the entire length of the trench. This will carry any water away from the house or the pool deck and prevent drainage problems. This can actually serve to add beauty and diversity to the pool area. Use decorative stone and continue it all the way around the pool deck to create a decorative border.

Here are some other things to consider regarding site work:

- Using dirt from the pool excavation to build up for the concrete patio is the most common method used to manage sloping yards. However, any time a patio or other structural element is constructed on fill material it is critical to insure that:
 1. Only suitable fill material is used, and
 2. It is properly compacted.

This is probably the biggest area of failure with most pool contractors, so be careful if you have a significant amount of building up to do in your yard.

- The objective of any site work is to achieve an acceptable degree of slope that:
 1. Can be easily maintained
 2. Does not conflict with other elements in the yard like sheds, swing set, etc.
 3. Drains wellJust remember, you're the one who has to look at it, live with it, and care for it.

Here are some pointers on landscaping sloping terrain:

- Anything greater than a 3:1 slope (1' of fall in a 3' span) will not take grass (typically). The seed simply washes out in these areas. But even if you can get it to grow, good luck cutting it.
- Some treatments to hillsides include mulch, pine tags, stone, gravel, ivy, etc. Use your imagination.
- Take advantage of terrain changes. I frequently see people with flat yards keep dirt from the pool excavation and use it to build elevated water features, mounds, or anything to give their property some topographical personality.
- Get your erosion control in place quickly. This is especially true around pools. It only takes one torrential thunder storm to wash a truck full of mud either toward or away from your pool. Neither of which is desirable.
- Think drainage. Look at how the yard will drain and plan your landscaping accordingly. Try to use stable material like decorative stone in high water flow areas to prevent wash out.

3. What challenges do you face?

Now that we have a firm understanding of the two methods of managing yard slope, let's take a brief look at the various types of slopes that may exist in your backyard. They are ascending, descending, and lateral slopes. These terms refer to the direction a slope falls from a point of interest, in our case the house. We'll also consider some of the inherent challenges and opportunities particular to each one.

Ascending slopes fall toward the house. In other words, the yard increases in height, or ascends, as you distance yourself from the house. The backyard is uphill from the house, so if you were to walk out into the yard and place a ball on the ground, it would roll toward the house. Here are some opportunities and challenges of building a pool on a site with an ascending slope:

Opportunities:

- It affords the opportunity to have an elevated pool and patio with a wall or landscape bed facing the house, which has great potential.
- The steps leading up to an elevated poolscape can be very attractive and inviting.

Challenges:

- Drainage can be a concern because everything in yard slopes toward the house.

- Because the pool and patio are often higher than, or level with the floor of the house, it gives you a lower perspective of the pool from the house. Consider this when planning pool height, fence location, or any other factors that could obstruct or otherwise affect your view of the pool.

Descending slopes are the opposite of ascending slopes; the ground falls away from the house.

Descending slopes are the most common type of slope found in backyards because the house is usually at a higher elevation than the rest of the yard.

Opportunities:

- Because the pool is lower, there is usually a more pleasant view of the pool from the house. As a general rule, the higher the perspective, the more appealing the view. You could capitalize on this by planning your pool location around a view from a specific place in the house.

Challenges:

- If a wall separates the pool from the house, and the pool is at a lower level, the wall can obstruct the view of the pool from the house. If this is important to you, be sure to create enough space between the wall and the pool to allow a clear line of sight of the pool from the house.
- A wall that is too tall or too close to the pool can give a cramped feeling. So be sure to allow enough space between the pool and wall for this purpose as well. As general rule, place a wall no closer than its height plus two feet to the pool. (3' wall would be 5' away from the pool).

Lateral slopes fall from one side of a lot to another.

Opportunities:

- The panoramic view across the yard shows the terracing of the poolscape. This perspective adds character to any site.

Challenges:

- In many cases water runoff **from** neighboring side lots can create an issue.
- Preventative measures must be taken to insure new water is not diverted **toward** neighboring lots.

Many lots are a combination of these various types of slopes. Because a wide variety of factors differentiate one yard from another, a cookie cutter approach to managing sites is impossible.

Well, that's it: Managing Sloped Yards 101! I hope this guide has helped you understand some of the intricacies of managing a sloping lot. You are now prepared with a full arsenal of info that will empower you to speak intelligently with your contractor or better yet, to take on the yard yourself. I want to reiterate one last word of advice: don't assume the contractor understands what you want your yard to look like in the end. There's no room for wishful thinking here. Be very clear and do whatever it takes to convey your expectations of what your finished project will look like. Good luck!