Utility conflicts with stormwater facilities are probably the greatest perceived physical constraint in implementing green street and parking lot projects. There is a perception that utilities and stormwater facilities cannot coexist, but they definitely can given the right site conditions. With some green street projects, especially those within low-density residential areas, there may be very few, if any, utility conflicts.

One significant constraint involving utilities and stormwater facilities is providing adequate access to utility lines for repair or replacement. This may require repair of a stormwater facility’s landscape and associated hardscape elements. The potential conflict, or question, is: Who is responsible for repairing any temporary damage to the stormwater facility? If this can be resolved between entities, then a major portion of the notion of “utility conflicts” can be resolved. Ironically, the use of sand-set pervious pavers and low-expenditure landscape stormwater facilities over utility lines might actually reduce the need for cutting and replacing concrete and asphalt and improve access to underground utilities.

Other utility conflict issues with green streets and parking lots include, but are not limited to: 1) providing adequate soil cover around utility lines and gravel envelopes; 2) minimizing the migration of infiltrated stormwater; and 3) finding adequate space for vaults and valve boxes next to stormwater facilities. Some of the typical utilities that need to coexist with stormwater facilities are listed in this page’s inset.

Prior to discussing in detail these secondary constraints, it is important to first describe the different approaches to dealing with potential utility constraints. The following page illustrates a process to help identify and resolve utility conflicts. This process emphasizes the ideal choices of either avoiding utilities or accepting the conflict in order to reduce construction costs. If this is not possible, more costly design solutions, such as mitigation or replacement/relocation of utility lines, can be explored.

The following pages showcase examples of specific green street and parking lot projects in Portland, Oregon that were built with varying degrees of utility conflict and have employed the different design approaches described in Figure 5-22. Showing specific projects should help put utility conflicts into perspective. It should be noted, however, that the specific project examples listed were built several years ago and might not reflect Portland’s current design standards or policy with utilities and stormwater facilities.

- Water lines
- Gas lines
- Sanitary sewer and stormwater lines
- Underground power lines
- Aboveground power and telephone poles
- Light poles and street signals
- Fiber optic and telecommunication cables
- Steam lines
- Valves and vaults associated with the utilities listed above
**STEP 1: AVOIDANCE**

Whenever possible, locate stormwater facilities clear of any utility conflicts. This may require that one particular stormwater design strategy (i.e., curb extension, stormwater planter, etc.) might be better suited for the site condition than others, even if it is more costly to build. Avoidance can also mean that a stormwater facility’s dimensions are reduced in order to provide an adequate setback from utilities. C.3 stormwater requirements must still be met for applicable projects.

**STEP 2: ACCEPTANCE**

Stormwater facilities may conflict with existing utility locations, but involved entities accept that utility constraints do not preclude the stormwater facility from being built. There is an acceptance that there is enough soil coverage or general clearance between the stormwater facility and a utility line(s). Also, if a utility line needs to be accessed, it is accepted that the stormwater facility would be temporarily impacted, but restored to its original condition.

**STEP 3: MITIGATION**

Stormwater facilities are allowed to coexist near a particular utility, but the original design or layout of a stormwater facility is adjusted in order to mitigate any concerns about the proximity to the utility. A stormwater facility’s design may need to be significantly altered to provide enough soil cover over a utility line, or key features of the stormwater facility (check dams, inlets, outlets, trees, etc.) may need to be moved to avoid conflict. An altered stormwater facility design must meet the C.3 stormwater requirements for applicable projects.

**STEP 4: REPLACEMENT**

In order to have the stormwater facility work, the utility line needs to be replaced and/or relocated so that a conflict no longer exists. This can be the most complex, cost-prohibitive, and difficult design option to implement. However, in some cases, the age of the utility line is a factor in selecting this solution. It might be more advantageous to plan on replacing an aging utility line during the green street or parking lot construction than to wait to replace it at a later date.
PROJECT EXAMPLE: ACCEPTANCE

NE Siskiyou Green Street (2003)
Portland, Oregon

A 6-inch water line runs parallel and through each curb extension. Also, lateral service lines tie into water meters within the existing grass strip. This project was built accepting that these water lines exist and adequate soil cover (36” inches +/-) exists over the water main lines and (18 inches +/-”) of cover was provided over the lateral service lines.
PROJECT EXAMPLE: ACCEPTANCE AND AVOIDANCE

SW 12th Avenue Green Street (2005)
Portland, Oregon

A lateral gas line runs perpendicular and through one of the four stormwater planters and connects to a nearby gas meter. A gas valve is also located within the stormwater planter and has a 6-inch PVC riser installed around the valve that allows for manual shut-off if necessary. This was a green street retrofit project that also had an existing light pole location to consider. The project’s design allowed for the light pole to remain in its original location, outside of the stormwater facility, and placed in a traditional landscape bed.
PROJECT EXAMPLE: AVOIDANCE AND MITIGATION

SE 57th and Pine Green Street (2006)
Portland, Oregon

A 6-inch water line runs parallel to this curb extension project and two large water utility vaults are located at the end of the curb extension. To avoid conflict with the need to have access for repair of the utility line, the curb extension was narrowed from 6’ wide to 4’ wide. A deeper curb profile was poured in order to help direct stormwater infiltration downward rather than laterally into the adjacent roadbed and gravel-filled water line trench. The curb extension was also shortened in order to avoid the water line vaults.
PROJECT EXAMPLE: AVOIDANCE

Harold Kelly Plaza Sandy Boulevard (2006)
Portland, Oregon

Harold Kelly Plaza is a neighborhood plaza with a vegetated swale placed on the side of the space. This plaza has an 8” water main running through its centerline. Early designs considered having the vegetated swale placed over the top of the water line, but it was determined that sufficient space was available to place the vegetated swale alongside of the plaza and avoid any water line conflict. In addition, sand-set concrete unit paving within the plaza to allow for access to the existing water line should the need arise.
**PROJECT EXAMPLE: MITIGATION**

New Seasons Market/SE Division Street (2004)
Portland, Oregon

This green street’s original design called for the consecutive placement of four stormwater planters to collect runoff from the adjacent street. An existing power pole and utility vault, however, forced the design to include only three stormwater planters and one planter filled with conventional landscaping. Relocating the utilities was too expensive, hence the design of the green street was adjusted to avoid the utility conflict. The missing fourth planter reduces the amount of runoff that receives treatment, but compromising on the design allowed this green street to still be built.
This green street uses a large stormwater curb extension to realign the intersection and treat runoff from the adjacent street. The street had an aging 6-inch water line that ran parallel to the existing curb and through the proposed stormwater facility. Because of the age of the water line, it was decided that the utility should be replaced and relocated at the time of the green street’s construction. In addition, the utility company that owned the water line agreed to pay a portion of the water line’s replacement and relocation costs; which helped justify implementation of the stormwater curb extension.
PROJECT EXAMPLE: AVOIDANCE

NE Sandy Boulevard Green Street (2006)
Portland, Oregon

There are several rain gardens built along Sandy Boulevard. The location shown above is an example of a large rain garden that had no utility conflicts. There are many instances in the built environment where green streets and parking lots can be built without any utility conflict. These conditions should be considered ideal spaces for retrofit projects.
Unwanted Migration of Infiltrated Stormwater

The following measures can help limit migration of infiltrated stormwater into surrounding utility systems, adjacent road beds, or adjacent building foundations:

• Install a thin, impermeable plastic liner along curbs or next to utility trenches.

• Construct a deeper than conventional curb profile to help physically separate the roadbed subgrade or parallel utility lines from the stormwater facility.

• Install a clay plug within the utility trench to inhibit the movement of stormwater within the trench line.

• Implement any combination of the aforementioned measures.

It should be noted that if soil permeability is relatively good on a project site, infiltrated water will primarily migrate downward rather than laterally. However, along streets with heavy-load traffic such as buses and trucks, it may be desirable to install one, or a combination, of the mitigation measures described above.

No Room For Utility Vaults/Infrastructure

Utility vaults can be a difficult constraint to overcome when placing stormwater facilities within streets and parking lots. In general, all utility vaults should be located outside of the “wet” zone of stormwater facilities. Many small utility vaults associated with lateral services (i.e., water service vaults) can be located outside of the footprint of stormwater facilities without needing to replace the infrastructure. However, when every square foot of space is at a premium, sometimes even these smaller vaults need to be relocated and replaced in order to maximize the amount of landscape space available for stormwater treatment. Larger utility vaults should be avoided whenever possible or completely lined so that water cannot migrate into the vault.

Figure 5-23: An impermeable liner is placed within a flow-through curb extension project to inhibit water migration into a nearby utility vault.

Figure 5-24: An impermeable liner is placed along the sidewalk side of an infiltration stormwater curb extension in order to protect the foundation of an adjacent building.

Figure 5-25: A deeper curb profile is poured along this green street project to help inhibit lateral migration of stormwater into the street’s subgrade.