4. Commercial and Industrial Projects

Applicants proposing commercial projects, like all others, must first address the avoidance and minimization requirements. Choosing a parcel that has plenty of upland surface area is important. If upland area is not readily available, developers should explore local zoning variances in order to avoid impacting freshwater wetlands.

By the nature of their use, commercial projects may require more mitigation for noise and light than other projects. Due to the amount of impervious surface that is often required, including driveways, large parking areas, and buildings, it is especially important to utilize effective stormwater management practices. The following practices can help reduce the impacts that these impervious surfaces may have on nearby wetlands.

Site Layout and Design

- Minimize wetland encroachment as much as possible by reducing the size or scope of the project.
- Avoid fragmenting wetland habitat and corridors.
- Locate projects in previously disturbed areas of upland.
- Be aware of how the project may affect ground or surface waters that drain to wetlands as a result of impervious surfaces.
- Incorporate appropriate soil erosion and sediment controls into the design following guidelines in the Rhode Island Soil Erosion and Sediment Control Handbook.

Paved Surfaces: Parking, Roads and Driveways

- Reduce the amount of impervious surface as much as possible.
- Design roads and entrances to be as narrow as possible through or adjacent to wetlands.
- Avoid or limit the number of wetland crossings. If a crossing is unavoidable, designing it so that the narrowest section of wetland is traversed usually results in reduced impacts. (See Chapter 9 for Crossing BMPs and Chapter 7 for Road BMPs).
- Consider a multi-level parking garage to minimize impervious surfaces (and runoff) and protect naturally vegetated zones.
- When designing a commercial or industrial subdivision, include details on the amount of impervious surface on each lot.
- Provide sufficient stormwater controls and treatments. Utilize Stormwater best management practices specified in the *Rhode Island Stormwater Manual* (pending revision 2010).

Lighting

- Avoid outdoor illumination, or use lamps or shields that deflect light away from the wetland.
- Install lamps at a greater height with a narrow beam to focus the lighting away from wetlands, or place the light next to the wetland and aim it in the opposite direction.
- Utilize motion-sensor lighting to limit the amount of time the area is illuminated.

Pervious Surfaces

Use of pervious surfaces are a good way to reduce impacts from development by reducing the amount of runoff. This alternative enables groundwater recharge and facilitates treatment of pollutants via the underlying soil. Common pervious surfaces include porous pavement, gravel, and geotextile grids.

Screens and Plantings

- Increase plantings along road sides within the Limits of Clearing and Disturbance, especially along wetland crossings, to reduce noise and disturbance and to provide replacement habitat for wildlife.
- Utilize retaining walls, berms or barriers to avoid filling into wetlands. Be sure to incorporate plantings into the design.
- Consider adding a roof garden, especially in redeveloped or urbanized areas, to help manage stormwater.

Construction and Maintenance

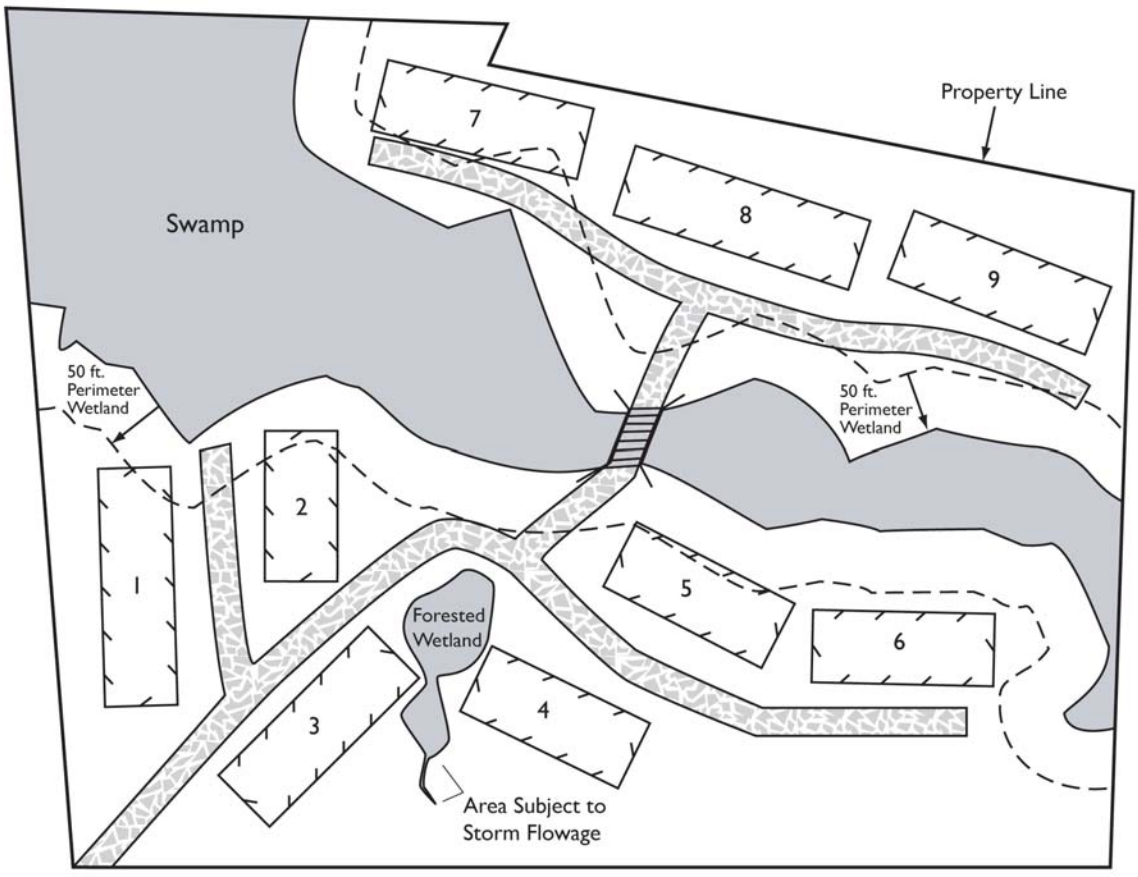
Development of commercial projects often involves the disturbance (clearing, grading, filling) of large tracts of land. As a result, it is vital that sediment and erosion controls are properly installed and maintained throughout the life of the project to prevent construction-related wetland impacts.

- To properly install controls on site, make sure silt fences are toed into the soil and bales of hay are securely staked into the ground and trenched into the soil.
- Install sediment and erosion controls as illustrated on design plans. Supplement these controls, within the approved Limits of Clearing and Disturbance, as the need arises (e.g., around soil, stockpile areas, matting/jute mesh on steep slopes, etc.).
- Schedule regular inspection of sediment and erosion controls (daily to weekly after storm events), and replace or repair them as conditions dictate.
- Specify inspection and maintenance requirements on all stormwater control elements, both during and post construction.
- Catch basin cleanup, regular parking lot sweeping, and litter cleanup should be specified where needed.
- Consider snow removal procedures, and designate a location for snow to ensure proper protection of wetlands.
- Place construction access roads and locate soil stockpiles as far away from wetlands as possible.
- Perform work near wetlands outside the breeding and migratory season of sensitive wetland species as much as possible.

Example 7a: **Storage Facility Original Design**

This example illustrates a proposed storage facility near a large Swamp, a Forested Wetland, and an Area Subject to Storm Flowage. Both the original and revised designs included proposed plantings around the Forested Wetland, although they are not shown in this illustration. However, the original design does not avoid and minimize in the following ways:

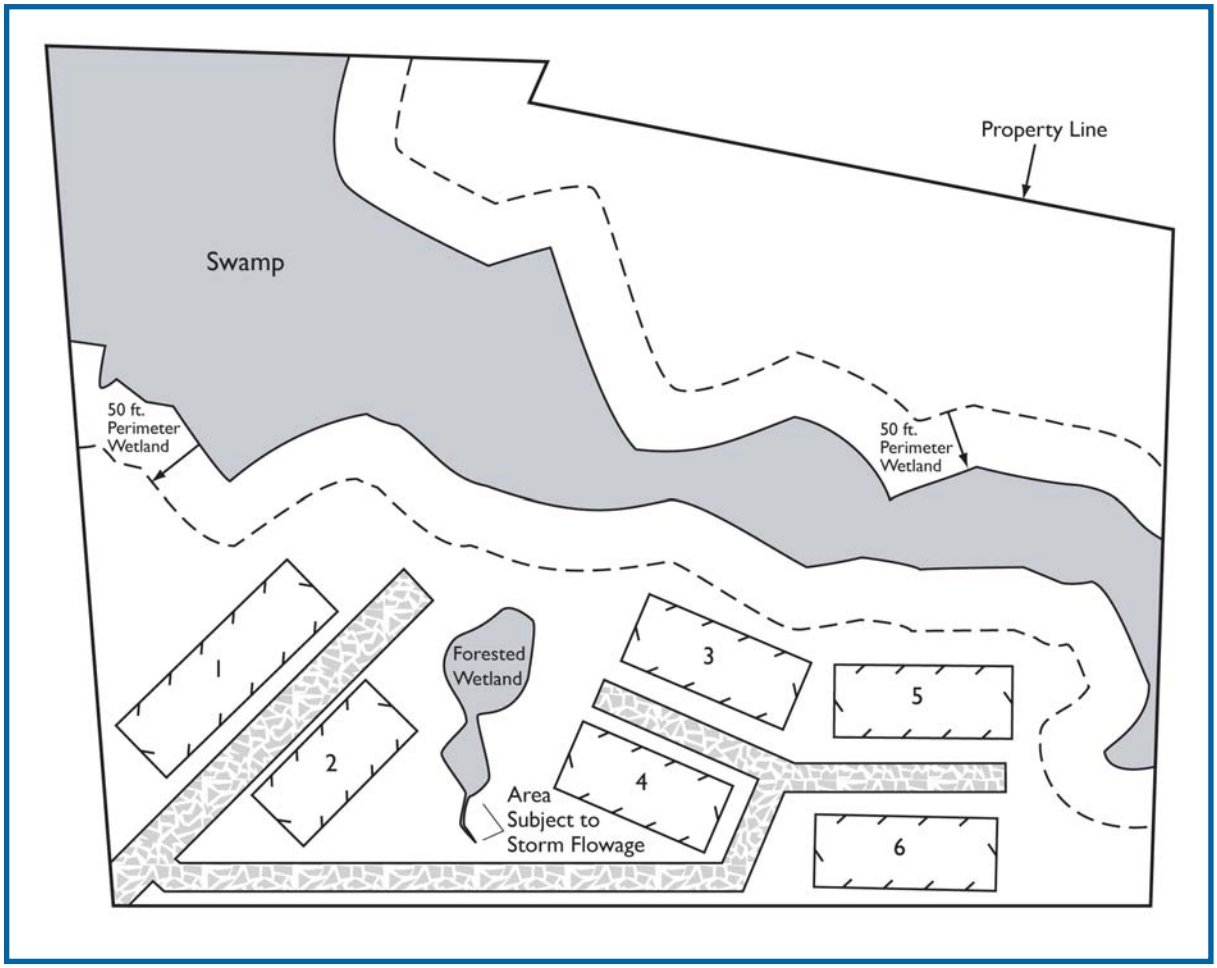
- The proposed buildings encroach into the Perimeter Wetland.
- A crossing disturbs the Swamp and Perimeter Wetland.
- The proposed driveway to the different buildings bisects the wildlife travel corridor between the Swamp and the Forested Wetland.
- The buildings are proposed within 10 feet of the Forested Wetland, which offers very little buffer against noise and light.
- There is little room to install sediment and erosion controls without disturbing the actual Swamp and further encroaching into the Perimeter Wetland.



Example 7a

Example 7b: Storage Facility Revised Design

Sometimes it is necessary to scale back on a design in order to minimize impacts to wetlands and to have a permittable project. This design improved upon the original design and still met the project purpose.



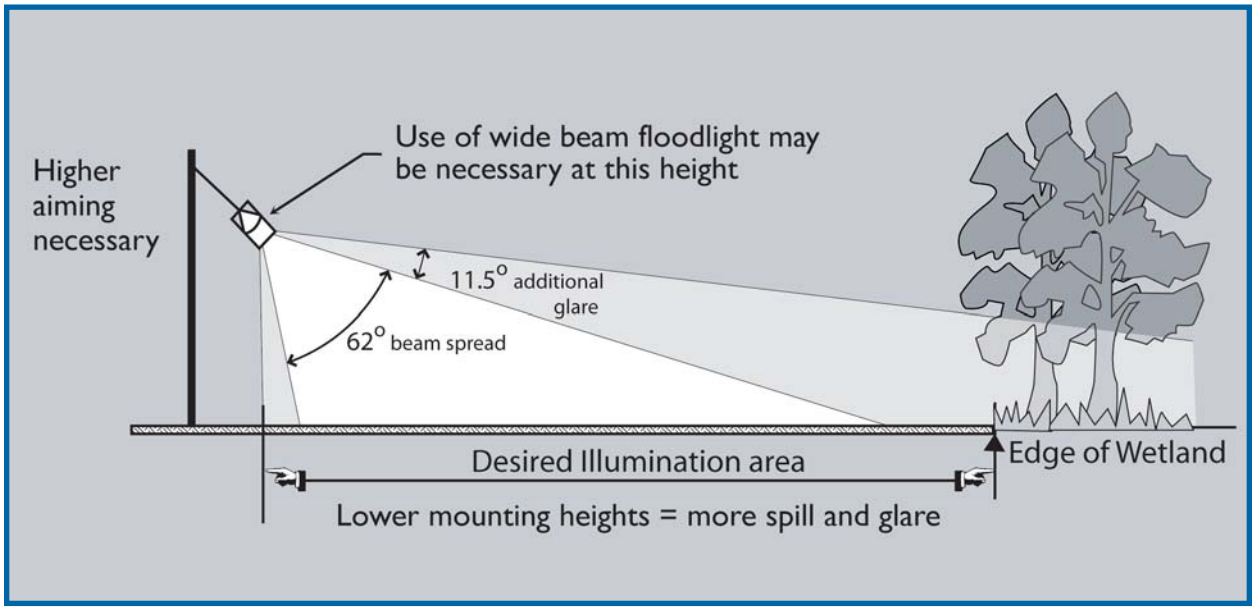
Example 7b

How wetland impacts were minimized:

- ✓ The buildings were moved farther away from all the wetland areas.
- ✓ The crossing and buildings above the Swamp (7, 8, & 9) were removed to minimize impacts and to avoid isolating the Forested Wetland from the Swamp.
- ✓ The footprint of the storage building to the left of the Forested Wetland was reduced, thereby increasing its distance from the Forested Wetland.
- ✓ The roadway was moved to avoid bisecting the travel corridor between the Swamp and the Forested Wetland.

Example 8: **Lighting**

This example illustrates a problem that can occur when directing lighting on commercial projects. If the correct lighting techniques had been used in this example, light would not have spilled from the parking areas into the Wetland. It is important to keep the light focused away from wetland areas so that wildlife is not adversely impacted by the project. The extent of the area to be lit is a function of the location of the lamppost, the height of the lamp, and where the light is directed to.



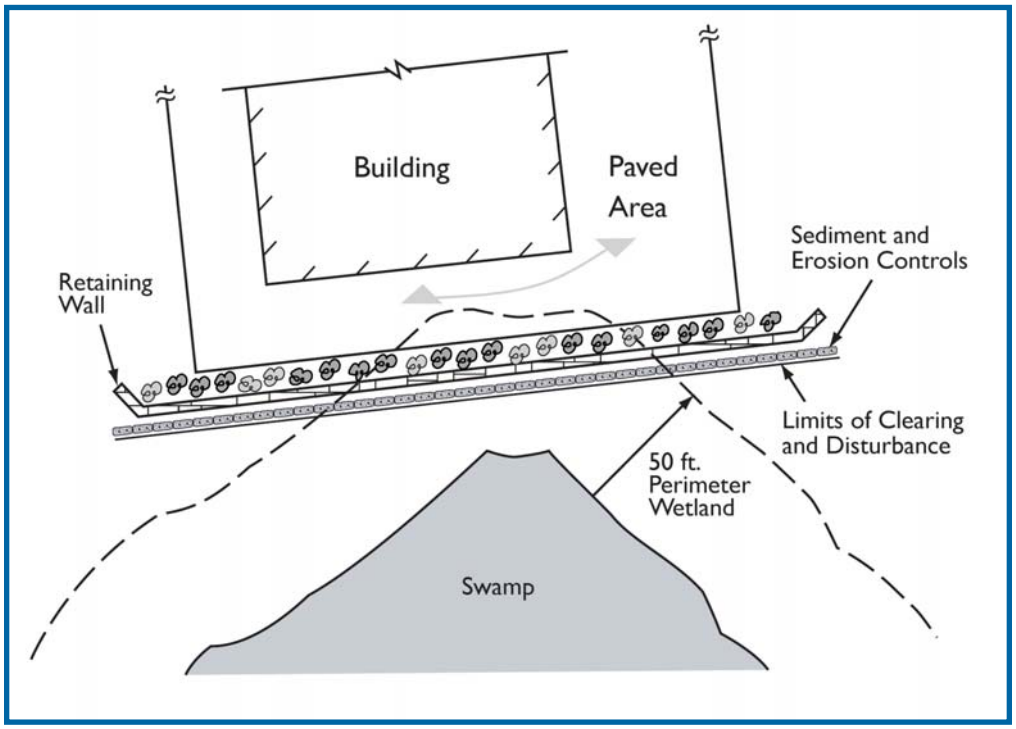
Example 8

How wetland impacts could be minimized:

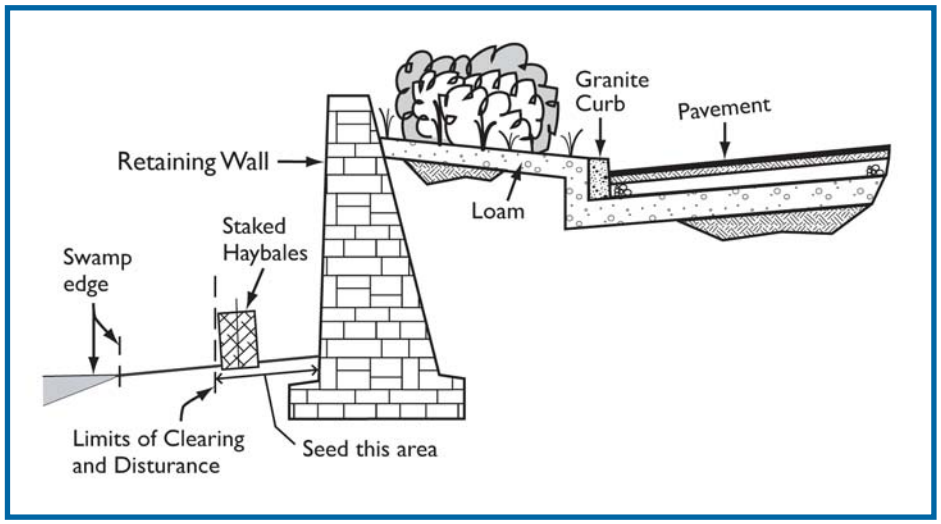
- ✓ The light could be mounted at a greater height and with a narrower beam to focus the light away from the wetlands, thus eliminating the spill and glare into the Wetland area.
- ✓ The light could be placed next to the wetland and aimed in the opposite direction to direct the light away from the Wetland area completely.
- ✓ If it is not possible to direct light away from the vegetated wetland areas, the use of deflectors to concentrate lighting away from vegetated wetlands must be employed.

Example 9: **Retaining Wall**

This drawing illustrates a commercial building project located very close to a Swamp and within the Perimeter Wetland. In this case, there were no alternatives available.



Example 9a



Example 9b

How wetland impacts were minimized:

- ✓ The retaining wall reduced the amount of fill needed to construct the parking/driving area around the building, thereby reducing encroachment into the wetlands.
- ✓ Plantings were installed on the upland side of the retaining wall to help provide additional screening against noise, light, and other disturbances.