Fact Sheet 5.1: Parks and Recreational Facilities

The mitigation objective of this Fact Sheet is to protect parks and recreational facilities, including picnic facilities, playgrounds, basketball and tennis courts, baseball fields, swimming pools and trails, from damage caused by hurricanes or floods.

This Fact Sheet describes mitigation solutions available for various components that are part of parks and recreational facilities, including:

- Associated structures found at parks and recreational facilities, such as playgrounds, sport fields and courts, swimming pools, benches, trash containers and fences
- Surfaces at these facilities that could be damaged by flooding or high winds, such as turf, trails and hard surfaces

Parks and recreational areas also can have different types of buildings and structures, such as recreation centers, maintenance facilities and picnic shelters. Because parks and recreational facilities can be used to help provide disaster recovery services, it is important to protect these facilities against the impacts of hurricanes and floods so they can serve these important functions. Information about mitigation solutions for buildings and structures are included in Fact Sheet Series 3, *Buildings*, which addresses foundations; walls and openings; roofs; HVAC, plumbing and electrical systems; and conveyances.

Parks and recreational areas also can have lighting, signs and poles to provide information to facility users about the facilities and to make them easier to use. Information about mitigation solutions for lights, signs and poles are included in Fact Sheet 1.5, *Roadways Lights, Poles, and Signage*. While that fact sheet is written in the context of transportation lights, signs and poles, the same mitigation solutions apply to lights, signs and poles in parks and recreational areas.

Some common mitigation solutions for protecting other parks and recreational facilities are summarized in Table 5.1.1.

Table 5.1.1. Common Mitigation Solutions for Parks and Recreational Facilities

Solutions and Options	***Strengthen***	***Anchor or Embed***	***Add or Modify Drainage***	***Aerate***	***Seed***	***Resurface***	***Stabilize Stream-banks***
Mitigation Solution: For Accessory Structures							
Option 1: Surface Mounts		✓					
Option 2: Chaining		✓					
Option 3: Embedding		✓					
Mitigation Solution: For Sport Courts							
Option 1: Resurfacing	✓					✓	
Mitigation Solution: For Landscaping							
Option 1: Drainage			✓		✓	✓	✓
Option 2: Turf				✓	✓		
Option 3: Trails and Hard Surfaces			✓			✓	✓

Mitigation Solution: For Accessory Structures

Accessory structures within parks and recreational facilities include playground equipment, benches, trash cans, fences, bicycle racks, etc. When not properly supported or anchored, storm surge, floodwaters, and wind can displace or damage these components so that they become water- or wind-borne debris, creating a threat of structural damage. Anchoring these structures can help prevent them from becoming potentially damaging debris.

Option 1: Surface Mounts

Surface mounts consist of clamps or brackets that can be bolted to concrete to help anchor structures in parks (Figure 5.1.1).

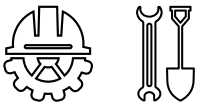
When evaluating this option, keep these considerations in mind:

- Place the clamp, bracket or mounting flange over the bottom part of the structure's frame.
- Drill holes into the concrete and use a wedge lock anchor or epoxy to anchor the clamp or bracket to the concrete.
- Hot-dipped galvanized or stainless steel brackets and anchors are recommended for outdoor use to resist corrosion.

Figure 5.1.1. Bolted brackets or clamps can be used to anchor some structures.

- Only use wedge lock anchors in concrete. When drilling into concrete, try to avoid drilling through rebar by obtaining the mesh spacing ahead of time. If rebar is encountered during drilling, it may be possible to angle the hole to miss the rebar and backfill the additional space with epoxy.
- Anchor embedment is a function of anchor diameter. Charts are available to indicate minimum embedment depth for different anchor diameters.

CONSIDERATIONS:



Option 2: Chaining

Attach chains or steel cables to heavy-duty helical ground anchors to help anchor picnic tables, benches, other park furnishings and some appurtenances (Figure 5.1.2).

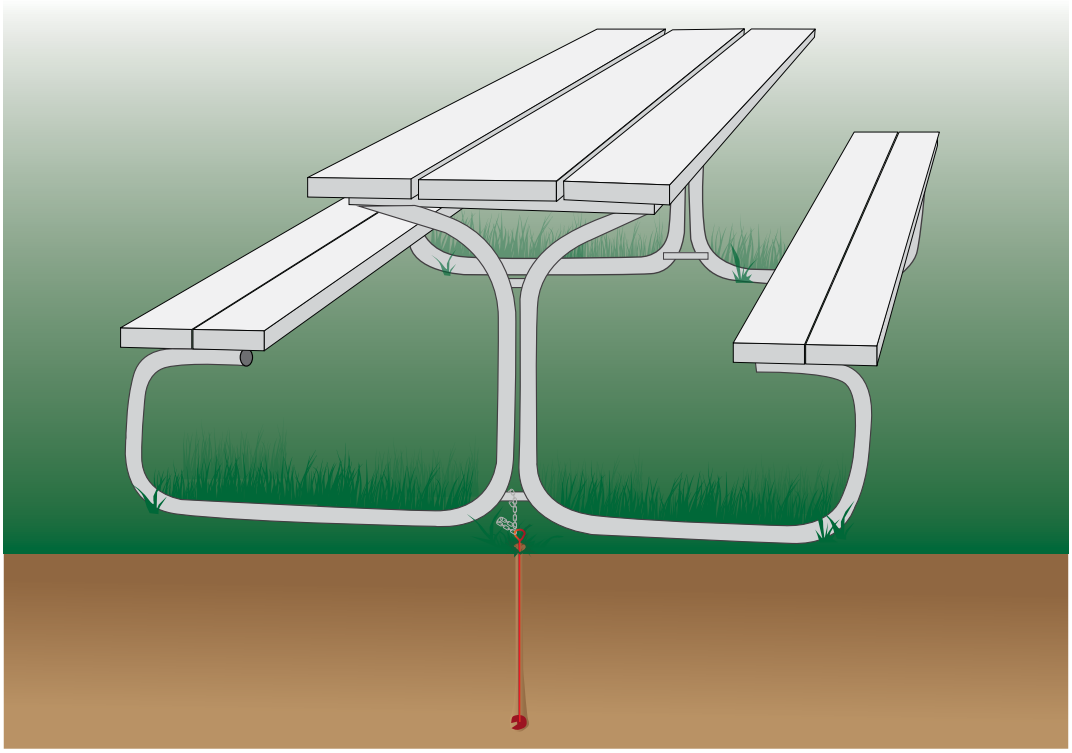


Figure 5.1.2. Chains or steel cables attached to ground anchors can be used to anchor park structures.

When evaluating this option, keep these considerations in mind:

- Install the ground anchor flush with the ground.
- Locate the anchor and chain so that they do not present a tripping hazard.
- Install the anchor deep enough to resist uplift forces.
- The soil must be strong enough to resist the anchor pulling out of the ground.
- The cable or chain should be corrosion resistant.

CONSIDERATIONS:

Option 3: Embedding

Embed the foundations or bottoms of some structures found in parks or recreational facilities deep enough in soil to prevent them from becoming dislodged by flood or wind (Figure 5.1.3). If the soil is not strong enough to support the structure, install it in concrete (Figure 5.1.4).

When evaluating this option, keep these considerations in mind:

- Embed poles and posts deep enough to prevent toppling failures.
- If on-site soils have enough strength, backfilling with soil is likely to be less expensive than backfilling with concrete.
- Place fence posts, bicycle racks, etc., in excavated holes and backfill the holes with concrete to anchor the posts.
- Backfilling posts placed in holes with concrete is recommended for asphalt, decomposed granite or earth surfaces.

CONSIDERATIONS:

Figure 5.1.3. Some park equipment can be embedded deep enough into the ground to improve stability.

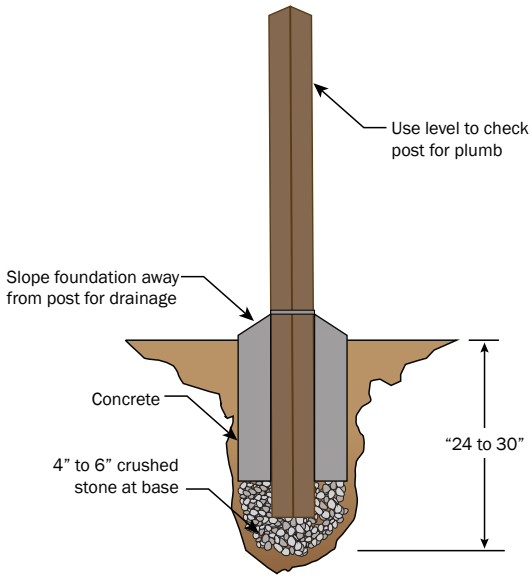


Figure 5.1.4. Poles and posts embedded in concrete can help resist wind.

Mitigation Solution: For Sport Courts

Option 1: Resurfacing

Basketball and tennis courts create areas for water to pond and run off. Depending on the condition of the court, standing water on these surfaces can be lessened.

- Resurface courts in good condition using an acrylic coating over the existing asphalt or porous concrete. This will make the surface more resistant to weather-related damage.
- Cracked courts may benefit from applying a geotextile over the existing court, then adding a layer of freely draining sand or gravel, and then applying new asphalt or concrete and the acrylic finish surface (Sprecher, 2009) (Figure 5.1.5).

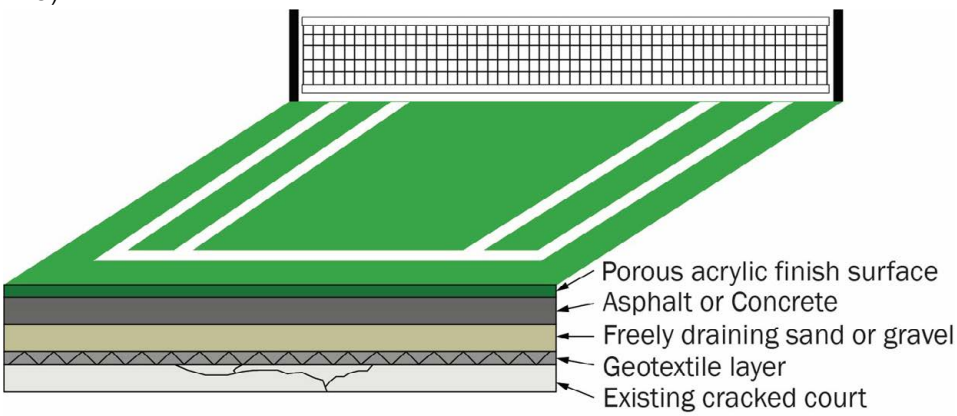


Figure 5.1.5. New courts can be overlaid on existing cracked tennis and basketball courts.

CONSIDERATIONS:

Mitigation Solution: For Landscaping

Option 1: Drainage

Because parks often are near flooding sources or in a flood zone, making the most of drainage is an important mitigation solution. Potential approaches for reducing surface flows and improving drainage include:

- Change the channel of a water body to increase its ability to carry moving floodwaters away from areas where damage could occur. This approach may require permits for working in water.
- Use both nature-based solutions (for example, bioswales) and hardscape principles (for example, installing a culvert) to improve drainage (Figure 5.1.6).

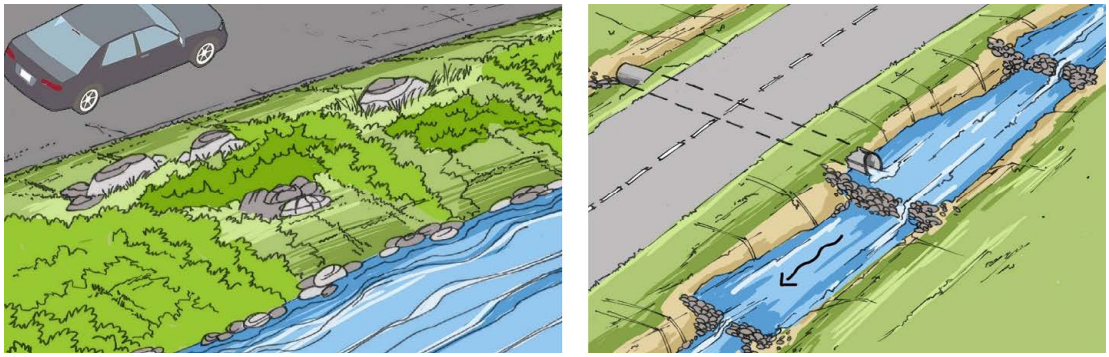


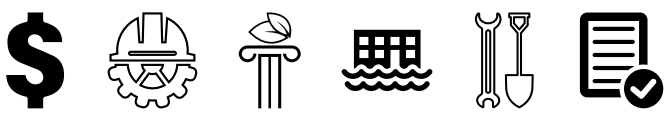
Figure 5.1.6. A bioswale can help retain floodwaters (left), and a culvert pipe can direct flow under a road or trail (right).

- Use native plants for nature-based solutions, as these plants easily adapt to the environment and are more resilient to natural disasters.
- See Fact Sheet 1.3, *Drainage and Culverts*, for additional information about drainage structures.
- See Fact Sheet 5.3, *Earth Slope Stabilization*, for additional information about nature-based solutions.

Drainage improvements may help in one area but create new challenges in another area. For example:

- Whenever drainage improvements are considered as a flood mitigation measure, evaluate the effects upstream and downstream from the proposed improvements using a Hydrology and Hydraulics (H&H) study.
- Other environmental concerns may arise with drainage projects. Consider topography, local and state environmental factors and requirements, U.S. Fish and Wildlife Service (USFWS) requirements, U.S. Army Corps of Engineers (USACE) permit requirements, the potential need for an environmental site assessment (ESA), and other federal environmental requirements when creating the mitigation project.

CONSIDERATIONS:

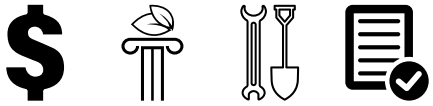


Option 2: Turf

Well-managed landscape and turf zones in parks and recreational areas help promote drainage and floodwater retention, while also decreasing erosion and sediment movement. Mitigation solutions using turf include:

- Manage vegetation to provide open space for native turfgrass, shrubs and trees to remain healthy.
- Control or eliminate harmful weeds and non-native plants using locally approved methods.
- Reduce soil compaction from foot traffic and machinery. Aerate and de-thatch as necessary to reduce soil compaction.
- Temporarily close off newly seeded areas to allow the grass to grow. Use clean straw or biodegradable fiber rolls to cover and protect seeded areas to help protect new seed.
- Provide underground drainage as appropriate prior to planting.
- Use multiple, short watering cycles to increase water absorption and decrease runoff.

CONSIDERATIONS:



Option 3: Trails and Hard Surfaces

Building and expanding pathways to guide pedestrian/bicycle and vehicle traffic in specific areas, which often are called greenways, helps maintain open space and natural areas (Figure 5.1.7). Erosion caused by flowing water can damage these pathways. Common mitigation solutions include:

- When designing trails, consider slope, width, soil and underground conditions to evaluate the erosion potential and maintenance needs, which will help make decisions about if or how a trail will be paved. Determine which permits will be required, if any.
- Elevate the surface structures above the design flood elevation to allow floodwaters to follow a more natural flow path.
- Stabilize streambanks along trails and hard surfaces to protect walkways from damage without losing the scenic value (Figure 5.1.8). Nature-based solutions can work well for streambank stabilization and provide additional environmental benefits.

Figure 5.1.7. Greenways can help direct and absorb floodwaters.

Figure 5.1.8. Nature-based solutions or hybrid approaches to streambank stabilization (combining hardscapes with nature-based solutions) can protect trails and other park facilities.

CONSIDERATIONS:

REFERENCES:

Detailed technical information on retrofitting and floodproofing methods, considerations, and general design practices can be found in these publications. This list is not exhaustive but provides some information that can be used for decision-making and design.

Federal Emergency Management Agency (FEMA). 2007. FEMA 551, *Selecting Appropriate Mitigation Measures for Floodprone Structures*. Available at: https://www.wbdg.org/ffc/dhs/criteria/fema551

FEMA. 2009. FEMA P-762, *Local Officials Guide for Coastal Construction*. Available at: https://www.fema.gov/emergency-managers/risk-management/building-science/publications?name=%22P-762%22&field_keywords_target_id=All&field_document_type_target_id=All&field_audience_target_id=All

FEMA. 2013. FEMA P-936, *Floodproofing Non-Residential Buildings*. Available at: https://www.fema.gov/emergency-managers/risk-management/building-science/publications?name=%22P-936%22&field_keywords_target_id=All&field_document_type_target_id=All&field_audience_target_id=All

Georgia Environmental Protection Division. 2014. *Greenspace and Flood Protection Guidebook*. Available at: https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/EPDGreenspace-Flood-Guidebook.pdf

National Parks and Recreation Association. 2019. "FEMA funding for building nature-based resilient communities." *Parks & Recreation* Magazine. Available at: https://www.nrpa.org/parks-recreation-magazine/2019/april/fema-funding-for-building-nature-based-resilient-communities/

National Park Service. 2012. *Standard Mitigation Measures*. Available at: https://www.nps.gov/yose/learn/management/upload/Appendix_A_Standard_Mitigation_Measures_508.pdf

New York City Parks Department. 2017. *Design and Planning for Flood Resiliency*. Available at: https://www.nycgovparks.org/pagefiles/128/NYCP-Design-and-Planning-Flood-Zone__5b0f0f5da8144.pdf

Sprecher, M.H. 2009. "Find the Right Fix." *Tennis Industry Magazine*. Available at: http://www.tennisindustrymag.com/articles/2009/03/17_find_the_right_fix.html

University of Massachusetts Extension. 2016. *Best Management Practices for Lawn and Landscape Turf*. Available at: https://ag.umass.edu/sites/ag.umass.edu/files/pdf-doc-ppt/lawn_bmp_establishment_2016_final.pdf