



1 Minimize Impervious Areas

An impervious area is one that does not allow water or other fluids to pass through or be absorbed. Minimizing impervious pavement protects on-site water quality and reduces runoff, which protects off-site water quality. Impervious cover is considered by many to be equivalent to some types of common pollutants. Oils and other pollutants that have built up on impervious surfaces when it's not raining are released during storms-- even very small, frequent storms – polluting waterways and may create slick roads and driveways.

New Developments

The planning and zoning codes of many jurisdictions will govern, and in some cases will require minimums for, the amount of total impervious areas in your watershed. But, there are a number of ways to minimize impervious pavement in new developments that may be applied in your neighborhood as well.

- On private property, reduce pavement widths to:
 - Sidewalks: 3'
 - Driveways: 8 – 10'
- Share parking spaces with a neighbor. In commercial districts, it may be possible to share parking with a church or other organization that has different peak hours from your land use.



Figure 1. Consider stepping stones instead of pouring a sidewalk.



Figure 2. Lawn tends to get compacted when not properly designed and will not grow in the place where you most often park your car.

- Eliminate unneeded pavement. The strip between the tires of cars often doesn't need to be paved. To preserve permeability in this middle strip, don't compact the soil and place 12" of clean, open-graded (all the same size) gravel. See Figure 2.

- Don't exceed front setbacks required by your city or town. The closer a building is to the street, the shorter the driveway and sidewalk to it. See Figure 3.

- Share a driveway with your neighbor. In some cases, especially for buildings far from the road, doing so can be very effective. Usually, the driveway is owned by one person and the adjoining property owner is granted an access easement. See Figure 4.

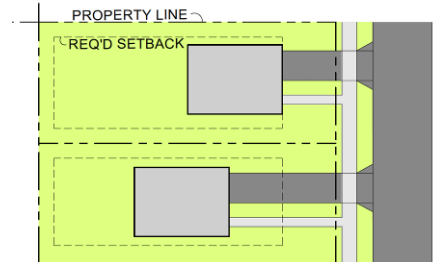


Figure 3. Exceeding setbacks generates additional paved sidewalks and driveways.

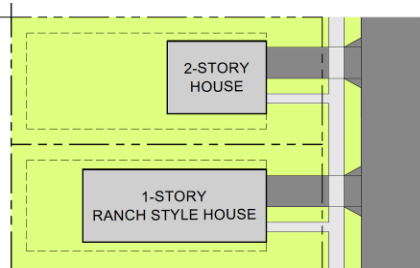


Figure 5. Go up, not out, with your floor plan.

- Minimize building footprints. A two-story house is better for the watershed than ranch style house of the same total square footage. See Figure 5.

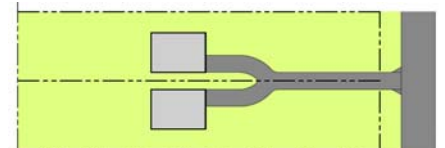


Figure 4. Share a driveway.



Figure 6. The driveway leading up to this two-car garage is kept narrow as it winds through the yard.

concrete is a way to allow rainfall to soak into the ground where it falls instead of generating runoff. This is achieved by ensuring that every layer of pavement (subsurface soils, base rock, and surface) is permeable. Siting, design, construction, and maintenance of pervious surfaces is different from that of conventional concrete. For more information on this approach, visit the National Ready Mix Concrete Association (NRMCA) website at <http://nrmca.org/GreenConcrete/default.asp>. Installation of pervious concrete differs significantly from conventional concrete, so use a contractor certified by the NRMCA. For certified contractors in California, visit http://www.nrmca.org/Education/Certifications/Pervious_Contractor.htm.

- Minimize driveway widths to a multiple car garage by flaring out the pavement in front of the garage. A depth of 20 feet will provide adequate space to maneuver. See Figure 6.
- In subdivisions, corporate campuses, etc., cluster development. Locate buildings and other features requiring road access in one place to reduce impervious area. This practice will also save money on constructing utilities such as water and sewer pipe.
- Opt for pervious instead of impervious (conventional) concrete. Pervious

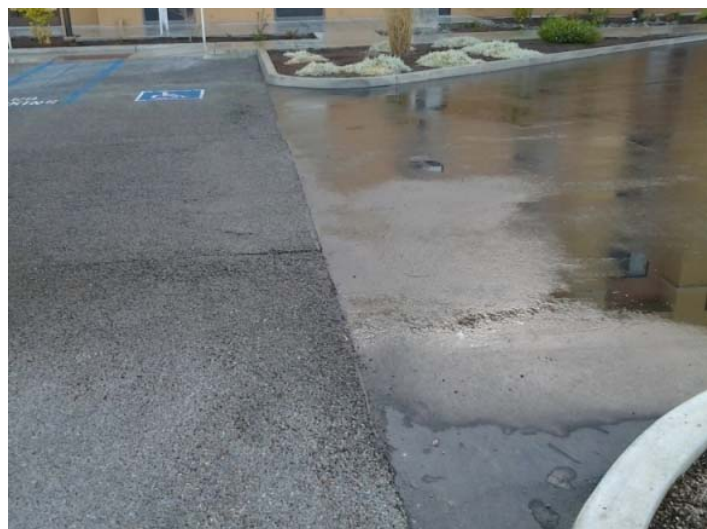


Figure 7: Pervious pavement (left side) and traditional impervious pavement (right side). Areas of pooled water are seen on the impervious surface.

Cost Considerations

In new developments, minimizing impervious pavement is a cost-saving or at least cost-neutral approach. Developers save money twice: 1) for every square foot of pavement they don't build, they save money on excavation and grading, compaction, materials, & labor; and 2) they can install a smaller, less expensive stormwater facility. In jurisdictions where no stormwater facility is required, this practice could be cost-neutral, assuming money is spent on soil amendments and landscape plantings instead of pavement.



Depaving Existing Hard Surfaces



Figure 8. Many small unused pavement areas add up to a lot of unnecessary pavement in a watershed.

It's likely that there are many little paved areas throughout the watershed that no one needs or uses, but when viewed altogether are impacting water quality downstream. Tearing out pavement and replacing it with landscaped areas – depaving – is an effective means of restoring your watershed. A good time to do this is when pavement gets worn and needs to be replaced anyway.

Deconstruction & Restoration

Below are some important factors when planning or considering a depaving project:

- Check local building or development services department to find out what codes may apply to your project. A permit may be needed if parking will be reduced or work is performed in the public right-of-way. Water quality rules will also usually come into play when excavating more than a certain threshold of dirt and materials.
- Where does runoff currently flow on-site? If it flows to the proposed depaved area, see additional information on vegetated filter strips in “2 Disconnect Impervious Areas”.
- Locate underground utilities. Call 811 to get your utilities lines marked (even on private property).
- Consider current land use and take appropriate cautions with contaminated soils. Soils that smell bad or look funny may be contaminated. It's a good idea to contact your local Natural Resources Conservation Service (NRCS) <http://offices.sc.egov.usda.gov/locator/app?agency=nrcs> for advice or ask an environmental scientist or engineer to help plan your project or find an alternative place to depave.
- Look up local noise regulations and think about which time(s) of day your project is likely to create noise.
- If you decide to depave areas of your property, keep the following in mind:
 - Safety comes first. Depave, a non-profit organization <http://depave.org/learn/how-to-depave/> has some great, detailed guidance on planning considerations, safety equipment, and more.
 - Depaving is messy. Implement erosion prevention and sediment control measures (e.g., covers for exposed soil; wattles). Avoid sediment fences, which aren't very effective at controlling fine soil particles like clay and silt.
 - Think about what you will do with the materials you remove (pavement and any rock below). Asphalt, concrete, and rock can be recycled or reused. However, avoid re-using crushed concrete in stormwater facilities, which can make runoff more basic in pH level and impact your soil.



Figure 9. Volunteers learn about the connection between impervious pavement and water quality as they work to remove asphalt at a school.



- At a minimum, the soils you expose should be amended with compost at a minimum. See “3 Restore Disturbed Soils” for more information. Depending on the pavement and rock depth removed, clean topsoil may need to be brought in so that the landscape area can meet and match existing grades.
- Revegetate the area with native grasses and grass-like plants, flowers, and shrubs. Trees may be planted if they will be planted in at least 240 square feet of soil that is at least 3’ deep. For information on plants appropriate for your region, see “9 Find Native Plants in Your Area”.
- Mulch the area with 2 – 3 inches of clean organic mulch that has no weed-seed or pollutants. Avoid yard waste if you use pesticides or accept it from others. Avoid wood chips and sawdust since this will rob the soil of nitrogen.

Cost Considerations

Depaving will always be more expensive than doing nothing, but your watershed is probably already impacted from the pavement that exists. Only addressing new development is usually not enough to significantly improve water quality – especially in urbanized areas. Many depaving projects to date have been done with volunteer labor, as a way of raising awareness about the connection between impervious pavement and watershed health. There are still costs associated with using volunteer labor including materials (e.g. imported soils, compost, erosion control, and vegetation) and services (e.g. waste removal and equipment rental). If volunteer labor will not be used, heavy equipment such as a backhoe will likely be the most cost-effective approach.

Maintaining Pervious Areas

- Maintenance for unpaved areas is the same as conventional landscape. Remove weeds twice a year.
- Replenish compost in gardens to a depth of 2-3 inches and lawns 1 inch every year.

Irrigation During 2-3 Year Establishment Period

To establish perennial plants, you’ll need to irrigate more in the first year and less in subsequent years. In addition, plants benefit from changing irrigation with the seasons. After summer starts and the rains stop, water a little. Increase water volume as the dry season continues. Taper off irrigation as the rains start to come back. Depending on your area and rainfall patterns, irrigation may be needed from May to October.

The volume of water and frequency of watering varies with the type of plant. See “9 Find Native Plants for Your Area” for information on preferred growing locations and watering needs. Some rules of thumb:

- Trees: 5-10 gallons, once/week
- Shrubs: 3-5 gallons once/week
- Groundcover: 1-2 gallons, once or twice/week
- Perennial herbs: ½ gallon, twice/week

If the planted areas are surrounded by pavement or conventional (hot) roofs, some irrigation beyond the establishment period will probably be needed. You may reduce your water demand by hand watering, using efficient irrigation systems (drip), and harvesting rainwater. To make hand watering faster/easier, find a 1-2 gallon container, poke a few small holes in the bottom, and place it next to the stem of the plant. Fill the container as many times as needed. This quickly delivers ideal volumes without causing erosion. For more information on rainwater harvesting, see “5 Build a Rain Barrel” and “6 Harvest Rainwater in Cisterns”.



Figure 10. Establishing vegetation in a depaved area.

5C Program

Five Counties Salmonid Conservation Program



Permits

Permitting varies, so check with your local jurisdiction's building or development services department to find out what codes may apply to your project. If information in this guidance conflicts with your jurisdiction's requirements or approach, then follow their guidance instead.

Bibliography

Information on depaving was copied and adapted from the following source:

Depave. (n.d.). Retrieved from Depave. From Parking Lots to Paradise.: <http://depave.org/>

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