

Upper Darby Township – Green Stormwater Infrastructure Ordinance Audit
Pennsylvania Environmental Council (PEC)
March 2022

Upper Darby Township – Proposed Code and Policy Recommendations

This report summarizes PEC’s proposed recommendations from the Barriers to Green Infrastructure audit of Upper Darby Township’s Codes and policies. PEC staff, coordinating with Upper Darby’s professional and appointed staff undertook an analysis of the zoning code, subdivision and land development ordinance and stormwater ordinance using an audit tool developed by the University of Wisconsin Sea Grant program. This tool included nearly 100 questions under twelve topic categories. The recommendations included in this report were prioritized to have the greatest impact in allowing and incentivizing green stormwater infrastructure practices within the township. These recommendations are intended to assist Township staff and elected officials in evaluating possible changes to current code language or policies.

PEC’s recommendations are divided into the following five categories: reference, flexible standards, incentives, site plan and education:

Categories

1. **Reference** – include definitions and terms consistent across codes and ordinances defining green infrastructure and best management practices.
2. **Flexible Standards** – include multiple options to fulfill requirements including flexibility on regulations with direct impact to implementing green stormwater infrastructure.
3. **Incentives** – incentivize green stormwater infrastructure practices within codes and ordinances.
4. **Site Plan** – including key items on the site plan allow green stormwater infrastructure to integrate into the project design at early stages.
5. **Education** – educating staff and the public on green stormwater infrastructure can assist in management and maintenance success.

1. REFERENCE

1. Audit Questions: Are naturalized landscaping standards and requirements promoted for use in stormwater treatment practices? Have primary types of green infrastructure practices (ex. bioretention/rain gardens, vegetated swales, green roofs) been defined in the stormwater ordinance or zoning regulations?

Audit Category: Landscaping and Stormwater

Code Reference: The Chapter 454

Stormwater code encourages Low Impact Development (LID) (Appendix E) and nonstructural BMPs (Appendix F, Table F-5), and lists 11 GSI practices and defines three of them (infiltration trench, seepage pit, and rain garden) in the O/M agreement template (Attachment 11, Appendix I).

Current Practice: There are three GSI definitions listed in O/M plan template, and encouragement for GSI via LID and non-structural BMP approaches, but GSI could be more purposively defined and promoted.

Recommendation: Include definition of GIS itself and expand definitions of GSI types beyond the three provided in Appendix I. GIS definition language can include: *green infrastructure refers to those methods of stormwater treatment and control that use the natural capacities of soil and vegetation to prevent or reduce stormwater runoff and associated nonpoint source pollution. Green infrastructure methods often are combined with conventional or structural stormwater treatment systems, such as separators, ponds, or underground systems, to create stormwater “treatment trains” that enhance stormwater treatment and water quality* (TBGSI Wisconsin, page 43). Consider expanding definitions beyond three the types of GSI and move definitions into the LID Appendix (E). Section 465.17 (Q) of Stormwater Management Code recommends that LID techniques be “considered.” Strengthen this language to allow the use of these LID/GSI practices “by right” across all codes.

**See Appendix for additional information.*

Why: The absence of language referring to green infrastructure is a barrier. Definitions make clear what types of measures communities wish to promote. Adding definitions of different green infrastructure practices is important to provide guidance and encourage applicants to use effective stormwater measures that are appropriate for the community. Barriers to including GSI in development projects will also be reduced if GSI practices are allowed “by right” across all codes.



Figure 1. Naturalized Bain in Aiden Lair Park, Upper Dublin (PEC)

2. Audit Questions: *Is there a maximum number of cars or area of off-street or driveway parking per single family residence? Is there a maximum driveway width (20 feet for residential, 24 feet at roadway opening, 26 feet for commercial, 30 feet at roadway opening)?*

Audit Category: Parking; Public Works Standards

Code Reference: ZONING § 550-33; SALDO (Section 805-B-3)

Current Practice: Private residential driveways shall be at least 8 feet wide. No maximum driveway area or width, no cap on number of cars per single family residence.

Recommendation: Consider amending Zoning § 550-33 Parking Regulations, Table 8-1: Table of Parking Requirements to include *maximum number of required parking spaces*, in addition to or in lieu of minimum requirements. Consider adding maximum driveway widths to support stated goals of reduced impervious cover.

**See Appendix for additional information.*

Why: Setting a maximum number of vehicles or off-street spaces can avoid expansive driveways. Driveways could also be required to be permeable or Grasscrete surfacing. Driveway widths can be limited to support both better access management and reduced imperviousness.



Figure 2. Residential parking and streetscape typology (Streetsblog NYC)

3. Audit Question: *Are standard specifications or performance standards adopted or referenced for permeable materials?*

Audit Category: Permeable Materials

Code Reference: Delaware County SLDO, Section 806 encourages use of permeable parking spaces and using permeable paving materials is listed as an alternative approach to manage stormwater runoff in Appendix E to Chapter 465 (Stormwater Management



Figure 3. Permeable Pavement Example (EPA)

Ordinance). No specifications or performance standards are referenced in the SALDO, Zoning or Stormwater Ordinance.

Current Practice: n/a

Recommendation: Include definition of acceptable permeable pavement systems in Zoning and SLDO and cross reference to PA DEP's 2006 BMP manual - Chapter 6 (BMP 6.4.1)- or similar guidance to help in reviewing systems that may be proposed in land development proposals.

**See Appendix for additional information.*

Why: Many state departments of natural resources or environmental protection publish standards that can be referenced in local standards or codes.

4. Audit Question: *Is there a process for regular post-construction inspection of stormwater treatment practices for both private and publicly maintained facilities?*

Audit Category: Post-Construction Standards

Code Reference: SWO Ch 465-32 and 34

Current Practice: Private entities are required to have an O/M agreement with the municipality for their private stormwater infrastructure, consistent with Appendix I agreement template. No required O/M agreement for public facilities.

Recommendation: Consider adding language in existing SWO Ch 465-32 and 34 to include publicly owned and maintained stormwater facilities. Alternatively, develop O/M standard and internal process for publicly owned and maintained stormwater facilities, consistent with SWO Ch 465-32 and 34 and/or Appendix I Stormwater Controls and Best Management Practices Operations and Maintenance Agreement.

Why: Regular post-construction inspections can be reported to the municipality or system owners may keep their inspection reports on file.

5. Audit Question: *Do purpose statements in zoning specifically include language that encourages green infrastructure or naturalized drainage?*

Audit Category: Zoning

Code Reference: ZONING § 550-2

Intent & Community

Development Objectives

Current Practice: No, does not include specific language

encouraging GSI or naturalized drainage.

Stormwater flows downhill into garden from surrounding area.

Stormwater is piped from the street to the garden.



Plants filter water and enhance streetscape. Water filters through soil.

Figure 4. Integrated stormwater feature (Yale 360)

Recommendation: Consider adding statement to § 550-2 Zoning Intent and community development objectives Section (G) to indicate the management of stormwater on site through best management practices for green stormwater infrastructure in accordance with standards set forth in the Stormwater Management Ordinance in Chapter 465 and/or current Pennsylvania Stormwater Best Management Practices Manual.

****See Appendix for additional information.***

Why: For example. "It is the purpose of these standards to promote the use of green infrastructure or vegetated stormwater management measures, where suitable, to manage stormwater runoff volumes and quality."

2. FLEXIBLE STANDARDS

1. Audit Questions: Are green infrastructure practices suitable for high-density areas (ex. Tree boxes, sidewalk bioretention areas, curb bump-outs) allowed or encouraged in streetscapes? Are these practices allowed to extend into the ROW or onto sidewalks?

Audit Category: Design Standards
Code Reference: SALDO Section § 806

Current Practice: Yes, it appears that GSI may extend into ROW, however "graded for proper stormwater runoff" could be changed to include BMPs.



Figure 5. High density green infrastructure integration (Sasaki)

Utility ROW's do not support GSI, but do support lawn, meadow, or trails. Could be more specific list of permitted measures/practices by right in these areas.

Recommendation: Suggest adding to list of permitted green stormwater infrastructure practices in SALDO §806, including allowing for low-impact development best practices such as tree trenches, and bioretention to reduce and slow stormwater flows in accordance with PennDOT criteria and the township's stormwater ordinance standards. Stormwater Control Measures such as planter boxes or cisterns should be specifically allowed to extend into the public right of way, unless deemed inappropriate by the Township **Manager**. Consider adding GSI plantings to approved plant list to encourage GSI practices in Utility ROW's. See Flexible Standards recommendation for question 2 below.

**See Appendix for additional information.*

Why: Streetscape standards may not enable stormwater trees, sidewalk bioretention, or curb bump-outs in new or renovated streetscapes. Most zoning ordinances specify what elements (ex. Awnings, signs) may extend into ROW. Planter boxes and cisterns often need to be added to the list and permitted to extend at least 24 inches into the ROW

2. Audit Question: Is the use of deep-rooted or native plants, plants with habitat value, or edibles allowed or encouraged in the landscaping standards?

Audit Category: Landscaping

Code References: The general SALDO landscaping requirements (Section 817 B) state that "Where possible, landscaping mentioned in this section should be utilized to help satisfy federal, state, and local stormwater management requirements". The SALDO Section 817, C, Table 8-6 specifies types of shade trees that should be planted along streets. Includes 20 native species and 10 non-

native/noninvasive species. This section also notes that if municipalities have a shade tree ordinance with an approved list of appropriate trees, that supersedes Delco SALDO.

Current Practices: Overall, SALDO landscaping requirements mention trees, shrubs, shade trees, but no specific mention of GSI vegetation. Shade tree list is two-thirds native species, but otherwise, use of native plants is not specifically encouraged.

Recommendation: Though SALDO generally supports use of landscaping for stormwater management, recommend more specific language on the use of native plants for landscaping and stormwater management. Include a list of native plants in the stormwater code (could be referenced in LID Appendix) that includes tree, shrub, and forb species and state that

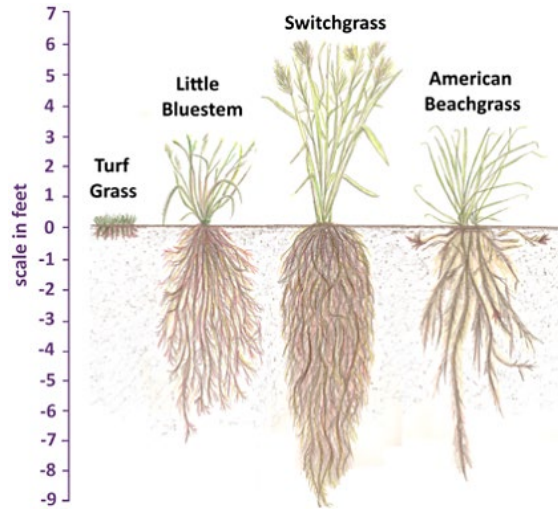


Figure 6. Native Plants vs. Turf Grass Root Depths (Mass.Gov)

they be used as default/priority choices of plant palettes in GSI features. Likewise, recommend that native species be the default/priority choices of trees for the shade trees listed in Table 8-6 of SALDO. Non-native plants and trees should require justification for why they are selected rather than a native alternative.

**See Appendix for additional information.*

Why: Native plants are well adapted to local conditions and upon establishment can thrive, providing multiple benefits ranging from stormwater management to wildlife and pollinator habitat, to urban heat island affect mitigation.

3. **Audit Questions:** *Is there a process or standard to waive numerical, spacing, and species requirements from stormwater-control measure in required landscape areas? Is berming of setback and landscape areas along ROW required and/or habitually preferred as a method of visual screening?*



Figure 7. Typical buffer vs. enhanced stormwater management function (MCPC Parking Guide)

Audit Category: Landscaping

Code References: SALDO landscaping requirements with buffers (Section 817 J-1) specifies evergreen trees and shrubs; not stormwater features. Zoning code for buffers (550.49 landscaping

and buffering) focuses on visual screening (e.g., 10-foot-wide buffer with evergreen plantings, or fence). Berming is allowed by SALDO in buffer areas (e.g., for parking lots and loading areas).

Current Practices: Buffering standards focus on visual and aesthetic issues. Berms allowed along with other buffer feature such as evergreen plants and fences. Overall, buffer requirements could be revised to enable use of stormwater or GSI features that also provide visual buffers.

Recommendation: Modify SALDO (Section 817 J-1) and Zoning buffer codes (550.49 landscaping and buffering) to allow for stormwater treatment buffers as an option which may include a combination of fencing and plant material for both screening and stormwater treatment. Buffer can include a mixture of stormwater management features where visual screening is still achieved. Require use of native plants in prescribed mix of deciduous and evergreen buffers. Add provision allowing alternative spacing if used as stormwater control measure. Include this stormwater treatment buffer option for the range of township required buffers (building, parking lot, other). For berms, recommend alternatives to allow for flexibility to incorporate stormwater management features that also provide visual screening.

Why: Codes often require buffers between properties or uses to be composed of a "dense evergreen hedge", a berm, or similar. Codes can be modified to provide an option for integrating vegetated stormwater-control measure where needed using a combination of fencing and plants for screen and buffer areas.

4. Audit Questions: Do parking lot edge landscaping requirements (islands, edges) specifically allow or encourage use as stormwater control areas? Is a standard adopted? Are flush curbs and/or curb cuts allowed to direct runoff into vegetated landscaped islands?

Audit Category: Landscaping
Code Reference: Article VIII of Zoning Code addresses parking and loading. Section

550.33.D.19.a (in parking lot design code) requires that interior landscaping be provided "within curbed island planters having a minimum area of 50 Ft²". SALDO Section 817- D.3.a.iv and v enables parking lot features to be landscaped to ameliorate stormwater drainage problems (iv) and replenish the groundwater table (v), and Section 817-D.3.f.iii allows for parking lot islands to be designed for the purpose of stormwater infiltration. Zoning code for parking lots (Section 550) provides general recommendation for tree and shrub planting in islands/perimeter but does not call specifically for GSI.

Current Practice: SALDO enables management of stormwater in parking lot features/islands. Zoning Code language provides general recommendation for vegetating parking lot islands and



Figure 8. Parking lot edge bioswale (MCPC Parking Guide)

Madison at New Britain, Chalfont, PA

perimeters but does not specifically call for GSI. Zoning Code also recommends interior landscaping be provided “within curbed island planters...”

Recommendation: Language in SALDO should be adopted within zoning code, allowing for stormwater management/GSI features including flush curbs and/or curb cuts that allow direct runoff into vegetated landscaped islands/perimeters. See Flexible Standards questions 1 and 3 for recommended plant species and planting requirements in GSI/parking lot stormwater management areas.

**See Appendix for additional information.*

Why: Enable installation of parking lot stormwater management/GSI features and provide guidance on native vegetation that can withstand/thrive in the harsh conditions that can be associated with parking lot landscaping islands/perimeter swales.

5. **Audit Questions:** *Is there a minimum size for parking lot landscape islands? Are there minimum landscaping requirements for parking lot perimeters or islands?*

Audit Category: Landscaping

Code Reference: Regarding minimum size, SALDO Section 817-D.3. f. i sets landscape island minimum of 9 feet by 18 feet. However, in Article VIII of Zoning Code which addresses parking areas, Section 550.33.D.19.a requires that interior landscaping be provided "within curbed island planters having a minimum area of 50 Ft²)".



Figure 9. Rain Garden Features - Wegman's Parking Lot, Montgomeryville PA (PEC)

Regarding landscaping, zoning code for parking lots (Section 550) provides general recommendation for tree and shrub planting in islands/perimeter but does not call specifically for GSI.

Current Practice: Regarding size, the SALDO requires a minimum landscape island size of 9 by 18 feet, or 162 ft², while the zoning code requires interior landscaping with curbed island planters having a minimum area of 50 ft². Regarding landscaping, the zoning code includes general recommendations for tree and shrub planting but does not specifically call for GSI.

Recommendations: Adopt higher minimum landscape island size requirement rather than the current minimums cited in the SALDO and zoning codes. Recommend using the overall minimum area requirement (340 ft² and minimum width of 9 feet) and the minimum soil volume requirement (1000 to 2000 ft³) for parking lot islands as noted in the MCPC's Sustainable Green Parking Lot Guide (see Appendix). Also, require that prior to planting, all debris and compacting construction soils be removed from planting areas and replaced with good quality loam soils to a depth of 30 inches. Require wherever possible, that existing trees, vegetation, natural slopes and

native soils be retained, protected, and integrated into parking lot landscape areas. See Flexible Standards recommendation number 2 listing appropriate native and GSI friendly plant lists.

**See Appendix for additional information.*

Why: Establish minimum area, volume, retention of existing trees/vegetation, and native vegetation landscaping standards so that parking lot landscaping areas can be adopted for stormwater/GSI features at sizes that allow native trees and other vegetation to thrive.

6. Audit Question: *Can landscaped islands for stormwater treatment be created within cul-de-sac or medians?*

Audit Category: Landscaping

Code Reference: SALDO Section 803-C design specifications require a minimum paved radius of 40 feet and outside radius of 50 feet. Ordinance also requires drainage to be directed to flow along the curb line and toward the open end of cul-de-sac if possible.

Current Practice: Ordinance does not enable stormwater management in cul-de-sacs or medians.

Recommendation: Amend SALDO and Stormwater Management Codes to include stormwater treatment within cul-de-sac islands as an allowable use. Address Public Works requirements (e.g., for snow plowing and fire truck access).

**See Appendix for additional information.*

Why: If standard specifications do not allow for different engineering designs, some variance procedure or alternative standard may be needed.

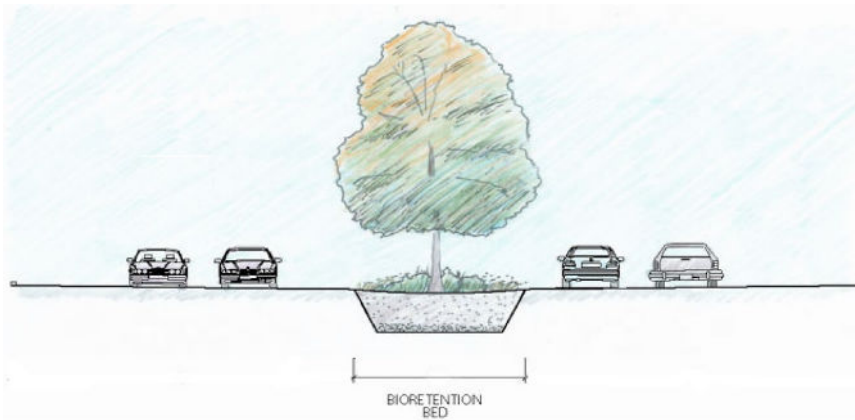


Figure 6.4: Cross-section view of a bioretention cul-de-sac. The island of the cul-de-sacs accepts stormwater from surrounding pavement

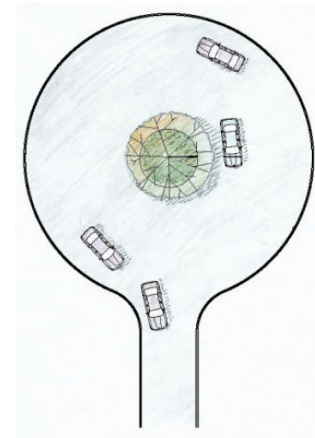


Figure 6.3: Cul-de-sac with bioretention

Figure 10. Section and Plan: cul-de-sac with bioretention (Philadelphia Water Department)

7. Audit Question: *Are street trees required or encouraged along streets?*

Audit Category: Landscaping

Code Reference: Code references street trees for shade (Section 817 of SALDO).

Current Practice: Shade trees must be located at least 5 feet from the right of way.

Recommendation: Consider revising SALDO 817 to enable management of stormwater via street trees and/or other features like bioswales, bump outs, and rain gardens in this verge are along street right of ways. Examples of such GSI practices include tree trenches and bioswales.

Why: Some tree lawn or terrace areas may be suitable for use as stormwater management areas or can be landscape with deeper-rooted plantings. Maintenance responsibility and an approval procedure should be specified.



Figure 11. Rain Garden along tree lawn (BioCycle)

8. Audit Question: *Are parking ratios set as maximum or median (rather than minimum) requirements?*

Audit Category: Parking

Code Reference: ZO § 550-33. Parking Regulations

Current Practice: No, parking ratios are set as a minimum, as indicated in Table 8-1: Parking Requirements - Minimum required parking.

Recommendation: Consider adding maximum and/or median parking requirements to Zoning § 550-33 Table 8-1: Table of Parking Requirements. This allows the township to regulate parking by use type within a set range of parking minimums and maximums, using a menu of strategies rather than parking space requirements.

**See Appendix for additional information.*

Why: Many communities set parking ratios, which effectively prevent "over-parking."

9. Audit Question: *Are low-volume street sections, parking lanes along streets, or driveway aprons allowed or encouraged to be permeable?*

Audit Category: Permeable Materials

Code Reference: n/a

Current Practice: n/a

Recommendation: In defined low volume areas, the Township may seek alternative paving materials to reduce

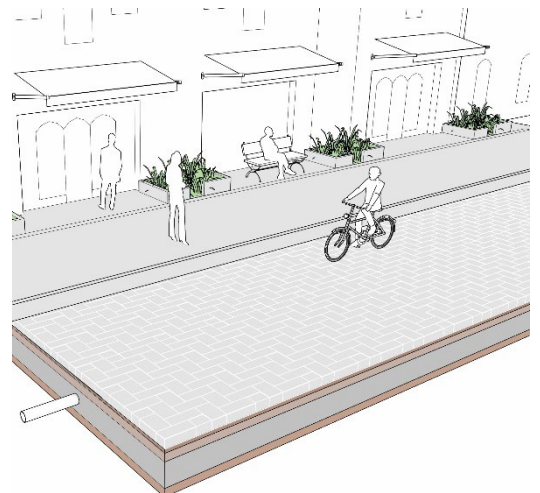


Figure 12. Pervious pavement on low volume street

impervious cover, as long as a set review and approval procedure by the township engineer has been established.

Why: One option is to write a general waiver in the code allowing permeable surfacing "upon review and approval of the township engineer." Many communities require all driveway aprons to be constructed of concrete. This can have the effect of prohibiting installation of French drains at driveway aprons.

10. Audit Question: *Can Grasscrete be used to meet public safety and fire access needs?*

Audit Category: Public Works Standards

Code Reference: SLDO 806. D

Current Practice: Permeable paving is encouraged in parking lots. Unclear if permitted in other contexts such as streets, alleys, or cul-de-sacs.

Recommendation: Related to the above, Grasscrete¹ and similar commercial products can sometimes be used in low use areas like overflow parking lots or alley ways, if such systems are acceptable for emergency vehicle use/access. Recommend that township be open to these commercial products as alternative to imperious paving and have some set standards for approving these systems.

**See Appendix for additional information.*

Why: Many types of commercially available permeable surfacing have sufficient structural strength to support fire trucks and can be plowed; these can be substituted for asphalt in areas of a site that must provide fire truck access to buildings.



Figure 13. Grasscrete surfacing (Sustainable Paving Systems)

11. Audit Question: *Can traffic calming measures be co-designed as stormwater control measures?*

Audit Category: Public Works Standards

Code Reference: SLDO 803

Current Practice: Traffic Calming measures encouraged in residential areas per SLDO 803 but no indication if these measures can be

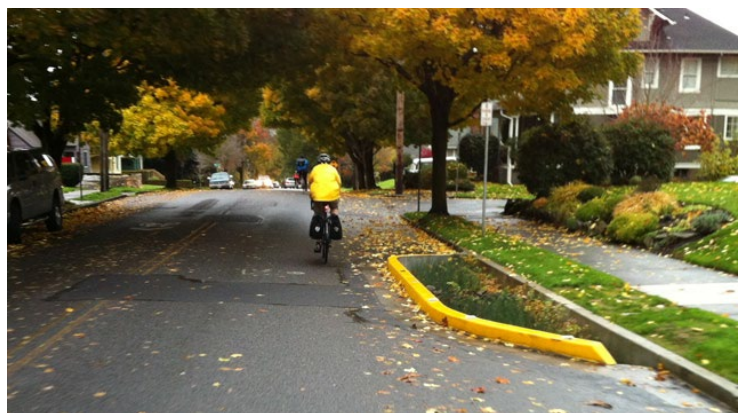


Figure 14. Stormwater curb extension, Portland OR (NACTO)

¹ Grasscrete is commonly known as Void Structured Concrete. Grasscrete is made by pouring concrete over "Formers", a mold that leaves voids in the concrete- that once opened can be filled with a variety of porous materials such as vegetation or no-fines stone.

designed as stormwater control measures. Not specifically prohibited.

Recommendation: Amend SALDO 803 to include reference and design standards for green stormwater management for traffic calming measures.

Consider incentives for projects that go beyond minimum infiltration standards. Upper

Darby Township would assume maintenance responsibility for projects in public ROW. Maintenance requirements and standards of care resources such as the [Philadelphia Water Department GSI Maintenance Manual](#) are included in the Appendix.

**See Appendix for additional information.*

Why: It is helpful to state specifically that islands and bump-outs that act as traffic calming measures are encouraged to be co-designed to provide stormwater management or green infrastructure functions.



Figure 15. Mid-block Stormwater Bump-out – Philadelphia Water Department

12. **Audit Question:** *Is a standard review process defined for removing impervious surface?*

Audit Category: Public Works Standards

Code Reference: Stormwater Ordinance 465-10

Current Practice: Stormwater Ordinance 465-10 – Definitions for reconstruction and redevelopment both refer to removal of impervious surfaces. No review process found in codes.

Recommendation: Create a standard or incentive to prioritize replacing impervious surface with pervious alternatives. Any changes must remain consistent with designated zoning use. Patios, walkways, parking areas, and driveways can all be converted to pervious areas that increase infiltration to groundwater. Gardens, lawns, and permeable pavers all can be used in place of the impervious area removed.

Other municipalities are removing impervious surface with programs such as:

- [Philadelphia Water Department: De-pave Your Yard](#)
- [Virginia’s Soil & Water Conservation Districts: Impervious Surface Removal](#)
- [Chesapeake Bay Foundation Report: Recommendations to Disconnect Impervious Areas from Stormwater System](#)

Why: In communities that are redeveloping, it is useful to have a standard for demolition or removal of impervious surface and replacement with sufficient soil and vegetation to enable stormwater infiltration.

13. Audit Question: *Is there a process for identifying or requiring measures that reduce stormwater runoff when existing developed sites are modified, even if a full stormwater management plan is not required?*

Audit Category: Stormwater Management

Code Reference: Section 465-6 B of Stormwater ordinance lists exemptions for land use activities.

Current Practice: Land development of up to 2,000 FT²

of new, additional, or replacement impervious surface, or up to maximum of 5,000 FT² of earth disturbance are exempt from drainage plan submission requirements.

Recommendation: Consider amending Section 465-6 B of the stormwater management code to include process for smaller projects that are exempt from standard stormwater management criteria (such as those for residential property improvements). Several southeast PA municipalities have lowered exemption criteria (some as low as 250 square feet) in its stormwater ordinances to require some management of new impervious cover created by smaller projects such as patio or driveway expansions. This process is typically found in an appendix to the Stormwater Ordinance.

**See Appendix for additional information.*

Why: Through zoning or stormwater ordinances, communities can require applicants to make easy modifications to sites to improve stormwater management when development occurs, even if a stormwater plan is not required.



Figure 16. Parking lot bioswale (Better Town Toolkit)

14. Audit Question: *Are native plantings specifically allowed in front yards of lawn areas?*

Audit Category: Landscaping

Code Reference: The Townships Nuisance ordinance (Chapter 376-5) identifies "dangerous trees or limbs, high grass, or weeds" as a nuisance condition. Section 417-11 (Amendments, Additions, and Deletions) to Chapter 417 Property Maintenance code notes that Section 302.4 Weeds is amended to define weeds as 10 inches in height.



Figure 17. Native planting buffer in residential yard (American Meadows Blog)

Current Practice: Regarding lawn areas with front yards, height limit in the nuisance ordinance could be interpreted to not allowing native meadow grass and flower species that exceed 10 inches.

Recommendation: Township could be amended Nuisance ordinance Chapter 376-5 and Chapter 417 Property Maintenance Section 302.4 to allow for native grass and wildflower meadows with provisions for managing edge, noxious weeds, and un-maintained areas. Consider ordinances developed by other townships that allow for wildflower meadows, naturalized areas, or other no-mow zones, assuming certain requirements are met such control on invasive species/noxious weeds and setbacks from streets, property line of developed lots, and structures.

**See Appendix for additional information.*

Why: Reducing the footprint of turf grass lawns will slow down and infiltrate stormwater runoff and provide habitat for native birds, butterflies, and other pollinator species.

15. Audit Question: *Do allowable uses for parks and other open space areas specifically include stormwater retrofits or green infrastructure projects?*

Audit Category: Zoning

Code Reference: SALDO 817

Current Practice: SLDO 817 does indicate that landscaping should be utilized to help satisfy stormwater management requirements. List of permitted uses does not specifically include SCM or GSI projects.

Recommendation: The list of permitted uses for parks/open space outlined in Article III, § 550-8, Table of Permitted Uses could be expanded to include "stormwater management and green infrastructure installations". Stormwater is a permitted use in open space areas, regardless of district. SLDO 817 should also include specific green stormwater infrastructure practices in addition to stating landscaping should be utilized to help satisfy stormwater management requirements.



Figure 18. Rain Garden -Lukens Park - Horsham Township (PEC)



Figure 19. Naturalized Basin in Aiden Lair Park, Upper Dublin (PEC)

Why: The list of permitted uses for parks/open space may need to include "stormwater management and green infrastructure installations" or a similar use to enable stand-alone projects.

16. Audit Question: *Are flexible dimensional criteria available for developers using planned development units, open space, or cluster design options?*

Audit Category: Greenfield Development

Code Reference: ZONING § 550-11 R-C Residential Conservation District; § 550-12 Special Residential Conservation District; ZONING § 550-30 Hospitality Overlay District

Current Practice: Closest reference is configuring 30% open space set aside for contiguous conservation under Hospitality Overlay District.

Recommendation: Recommend the Hospitality Overlay District, Residential Conservation District and Special Residential Conservation District include the land preservation option by-right and conventional either by Conditional Use, or at half the underlying density. To encourage conservation option as the preferred choice, it should be the easiest option to follow.

Why: Reducing lot widths and minimum sizes reduces the amount of land area disturbed for new development, the total length of roadway and associated impervious surface required, and the amount of turf-grass for lawn, all of which reduce the volume of runoff and pollutant loads associated with new development.

**See Appendix for additional information.*

17. Audit Question: *Is cluster development open space managed for water quality benefits?*

Audit Category: Greenfield Development

Code Reference: ZONING § 550-11 R-C Residential Conservation District; § 550-12 Special Residential Conservation District

Current Practice: No specific language calling attention to water quality benefits besides encouraging conservation where surface water and flooding prevents viable development. Consider adding language to R-C and R-C-1 promoting GSI.

Recommendation: Consider adding language to § 550-11 R-C Residential Conservation District and § 550-12 R-C-1 Special Residential Conservation District (F) so that green stormwater infrastructure is defined, accepted, and encouraged to manage stormwater runoff. Also consider adding green stormwater infrastructure practices to Article III, § 550-8, Table of Permitted Uses and allowing in both § 550-11 R-C and § 550-12 R-C-1.

Why: For water quality benefits, a maximum of the open space should be in forest, trees, shrubs, and meadows.

3. INCENTIVES

1. Audit Question: *Is a shared parking agreement format, calculation, and administration procedure for changes in use in place?*

Audit Category: Parking

Code Reference: ZONING § 550-33 Parking Regulation

Current Practice: Specifies required parking total is calculated by individual use, but 25% reduction applies to cumulative total.

Recommendation: Consider amending Zoning section § 550-33 B. General Parking Regulations, (b) to include a table for calculation of parking spaces required based on use and section (b) [4] to allow shared parking by right, without need for approval by special exception from the Zoning Hearing Board.

Why: Rather than requiring each applicant to justify the number of spaces in a shared parking plan, a table with formulas can be provided to streamline the process and make it easier to administer.

2. Audit Question: *Are incentives provided to developers who reduce impervious cover, conserve natural areas, or implement stormwater reduction practices like green roofs, rain barrels and rain gardens?*

Audit Category: Stormwater Management

Code Reference: One reference to incentive observed in zoning code § 550-23 C-3, Table 5-2, Traditional Downtown Business District Development Incentives which provides building height bonuses for green roofs.

Current Practice: Incentives limited; just building height bonus for green roof.

Recommendation: Incentives should be considered for additional GSI practices that go beyond Township's stormwater ordinance minimum required volume and water quality standards. These could be incorporated via bonus provisions in certain zoning districts to “reward” developments that include GSI practices. There are a wide variety of incentive types to encourage use of GSI and reduce impervious cover for a range of uses from large commercial properties to residential systems.

**See Appendix for additional information.*

Why: Incentives can be more effective than intervention in encouraging implementation of GSI in new and redevelopment.



Figure 20. Stormwater tree trench (Philadelphia Water Department)

3. Audit Questions: *Is there a clear process for approving green infrastructure, flood management or environmental restoration projects? Would these projects be allowed in all zoning districts?*

Audit Category: Zoning

Code Reference: ZONING § 550

Current Practice: Approval process could not be identified in ordinances.

Recommendation: Green stormwater infrastructure should be permitted by right in all mapped districts and not require special approvals by either ZHB or Council. These stormwater control measures should be evaluated as part of design review by Township Engineer.

Why: The zoning code should note whether land modifications to implement wetland or stream restoration, construct stormwater retrofits or modify landscaping and grading require planning commission, elected council or staff approval and whether approval goes through site plan, conditional use, or another approval process.

4. SITE PLAN

1. Audit Questions: *Has the community identified historic stream channels and waterways? Are any of these features protected from modification or development?*

Audit Category: Construction Management

Code Reference: SALDO Section 801-H General standard

Current Practice: SALDO Section 801-H General standard requires that development must be fit to existing conditions and natural features of the site including natural terrain and natural drainage (to maximum extent practicable).

Recommendation: Consider amending SW Ordinance Section § 465.12 B 4. Stormwater Drainage Plan Contents (other physical features) to include location of historic stream channels and waterways. Amend SLDO Section 402.15 Sketch Plan Requirements to add historic stream channels and waterways to significant natural features. Historic stream channel data is available via the [Pennsylvania Spatial Data Access Portal](#).

Why: Areas where historic stream channels and ponds have been filled in or modified are often prone to flooding. They may be good areas to incorporate into stormwater management features, open space, or landscaping. Adding to sketch plan requirement carries through to preliminary and final subdivision plan submissions.

2. Audit Question: *Are there standards for outdoor storage areas?*

Audit Category: Pollution Reduction

Code Reference: SALDO Section 817 Landscape Plan

Current Practice: Yes, there are landscape buffer standards for outdoor storage areas.

Recommendation: As part of the development/site plan review process, township review of outdoor storage areas proposed within or outside of sensitive environmental areas should ensure that there are appropriate measures such as vegetated buffers, cover, and containment systems, and grading away from any stormwater inlets etc., are explicitly shown on plans.

Why: Outdoor storage and contractors' yards can become substantial sources of nutrients, toxics, metals, or sediment in runoff. Review should ensure vegetated buffers, grading plans, or other measures are in place

3. Audit Questions: *Is snow storage in bioretention areas prohibited or discouraged unless the area is specifically designed for snow storage? Are snow storage areas required to be shown on site plans?*

Audit Category: Landscaping

Code Reference: No ordinances observed addressing snow storage areas.

Current Practice: No ordinances observed addressing snow storage areas.

Recommendation: Consider need for specific snow storage areas (existing or proposed), where those storage areas should be located, and how they should be managed. Require that stormwater site plan requirements include locations of existing and proposed snow storage areas. The Appendix includes guidance document references on the siting and management of snow storage areas, focusing on protecting water supply areas/aquifers/waterbodies and other salt vulnerable areas such as wetlands. Specific areas of concerns in Upper Darby Township are the commercial and parking lot areas where snow stockpiling is more likely to occur. The protection of dedicated stormwater management bioretention areas should also be considered. Upon the dedication of specific snow storage areas, add requirement to include existing/proposed areas dedicated for snow storage on SALDO plan(s).

**See Appendix for additional information.*

Why: Snow storage should be located in areas where melting and infiltration can occur without affecting the performance of stormwater treatment practices or leading to sedimentation and pollution in adjacent streams/wetlands/water supply areas.

4. Audit Question: *Is a consolidated plan for landscaping, grading/drainage and stormwater-control measures encouraged or required?*

Audit Category: Landscaping

Code Reference: SALDO Section 817 details landscaping plan, with 817-H noting plan must be submitted at same time as other applications/plans.

Current Practice: No indication that plans are consolidated on same sheet

show integration. **Recommendation:** Consider consolidating landscaping, grading, drainage, and stormwater control measure plans to show integration.

Why: Putting grading/drainage and landscaping plans on the same sheet illustrates where and how landscaping and stormwater management can be integrated.

5. EDUCATION

1. **Audit Questions:** *Has green infrastructure education been provided to staff involved in plan reviews? This includes staff in public safety, engineering, parks and recreation, economic development, and planning and zoning.*

Audit Category: Education + Outreach

Policy Reference: Internal Practice

Current Practice: n/a

Recommendation: Continue to take advantage of training programs offered through Eastern Delaware County Stormwater Collaborative, local watershed groups, Pennsylvania Environmental Council, Delaware County Planning Commission and/or Engineering Consultant.

Why: Training provides a common base of knowledge about GSI techniques and their applicability in the community.

2. **Audit Question:** *Has green infrastructure education been provided to planning boards and elected officials?*

Audit Category: Education + Outreach

Policy Reference: Internal Practice

Current Practice: n/a

Recommendation: Continue and/or expand training programs in partnership with Township Environmental Advisory Council, Darby Creek Valley Association (DCVA), Eastern Delaware County Stormwater Collaborative (EDCSC), Pennsylvania Environmental Council, Delaware County Planning Commission and/or Engineering Consultant.

Why: Training provides a common base of knowledge about GSI techniques and their applicability in the community.

3. **Audit Question:** *Is a review or procedure in place for downspout or foundation drain disconnection and rain barrel installation?*

Audit Category: Education + Outreach

Policy Reference: Internal Practice

Current Practice:

Community Scoping Form:
Community has not adopted downspout or foundation drain disconnection program.

Recommendation: Continue to refer those interested in

rain barrels to contact DVCA staff, or EAC. Consider adding guidance for downspout disconnection and foundation drain disconnections to township website.

**See Appendix for additional information.*

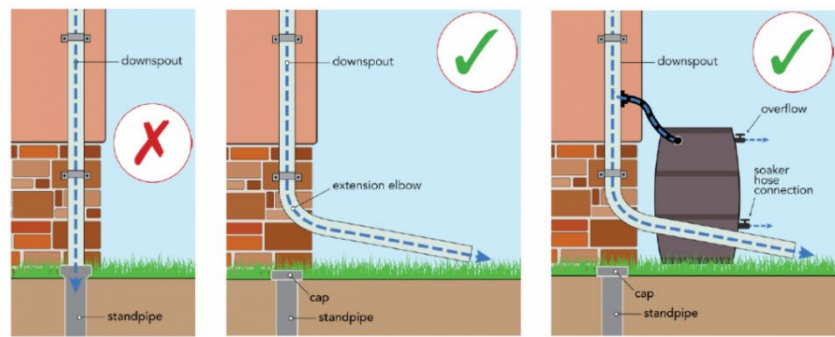


Figure 21 - Downspout Disconnection Program (DC Water.Com)

Why: Having a written procedure (even if not formally adopted) for common requests facilitates the use of these techniques and helps manage neighbor inquiries and public concerns.

4. Audit Questions: *Is a review or procedure in place for rain garden construction and planting native plants in yards and lawns?*

Audit Category: Education + Outreach

Code Reference: n/a

Current Practice: There is no current procedure for review. Turf grass is indicated as preferred lawn cover (page 4, Community Scoping Form). Residents have installed rain gardens and 3 local organizations have initiated GSI projects/programs.

Recommendation: Building on current pilot programs, recommend establishing workforce development training in partnership with local watershed groups/PEC, Delaware County Planning Commission & Engineering Consultant who can provide resource guidance on design, construction, and maintenance of residential GSI. Also recommend simple small project design guidance for homeowner rain gardens and other small scale or residential green stormwater infrastructure. Note: individual homeowners are responsible for implementation and maintenance of GSI on private properties.

Why: Having a written procedure (even if not formally adopted) for common requests facilitates the use of these techniques and helps manage neighbor inquiries and public concerns.

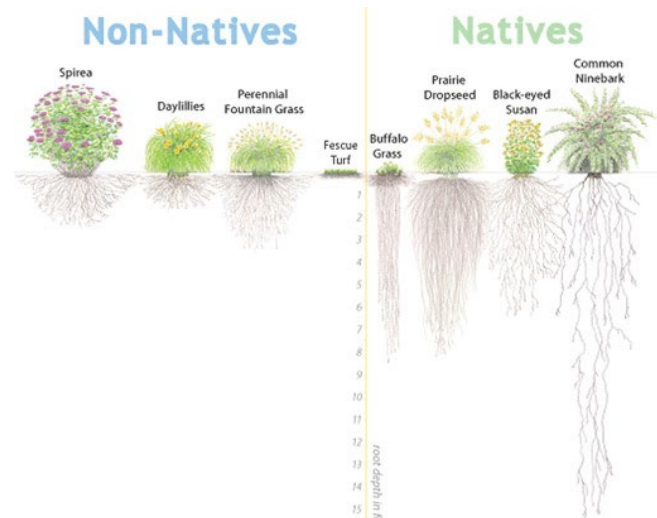


Figure 22. Native vs. Non-Native plant profiles (Reduce Your Storm)

5. Audit Questions: *Does the municipality have experience with permeable material, curbless streets, or other green infrastructure measures?*

Audit Category: Permeable Materials

Code Reference: SALDO: Section 806-D under Parking Areas and Parking Lots

Current Practice: SALDO (Section 806-D under Parking Areas and Parking Lots) states that parking areas with permeable spaces are encouraged as BMPs as part of stormwater management design to reduce stormwater runoff. Additional methods, such as vegetated swales, can also be provided.

Recommendation: Township should consider providing training for municipal staff on maintenance of permeable pavement system in place (e.g., 2nd Ward Playground). Additionally, consider adding specialized maintenance equipment when installing green infrastructure or any new infrastructure, in the bidding process.

****See Appendix for additional information.***

Why: Work to build staff knowledge about the use and proper care of permeable materials.

Upper Darby Township – Green Stormwater Infrastructure Ordinance Audit
Pennsylvania Environmental Council (PEC)
March 2022

APPENDIX

1. REFERENCE

1. Audit Questions: *Are naturalized landscaping standards and requirements promoted for use in stormwater treatment practices? Have primary types of green infrastructure practices (ex. bioretention/rain gardens, vegetated swales, green roofs) been defined in the stormwater ordinance or zoning regulations?*

Pennsylvania Stormwater Best Management Practices Manual, Section 6 Comprehensive Stormwater Management: Structural BMPs provide background information on various types of best management practices including GSI features (see [Section 6 - Structural BMPs - part 1 \(state.pa.us\)](https://www.penn.gov/section-6-structural-bmps-part-1))

Lower Merion Township Stormwater Management Code, Chapter 121-4, Section G language addresses landscaping of stormwater management facilities and related natural resources. The code emphasizes native plants (e.g., wet meadows on basin floors planted with wildflowers and nonaggressive grasses; wet edges planted with wildflowers, grasses, and shrubs; wooded areas plantings that provide for wildlife habitat; slopes with grasses/wildflowers; steeper slopes with shrubs; and buffers that provide food and shelter for wildlife. Non-native plants and trees should require justification for why they are selected rather than a native alternative. See Lower Merion Township Code for more details at <https://ecode360.com/6529398>

Lower Makefield Township SALDO, Article X1, Landscape and Open Lane Requirements, Section 178.80 (see <https://ecode360.com/11225201>) addresses the conservation of the natural landscape to enhance the development and to protect surrounding areas. All required plants shall be native plants. The basic goal is to preserve the native flora by mimicking the localized native plant community.

2. Audit Question: *Is there a maximum number of cars or area of off-street or driveway parking per single family residence?*
3. Audit Question: *Are standard specifications or performance standards adopted or referenced for permeable materials?*
<https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement>
<https://www.epa.gov/system/files/documents/2021-11/bmp-permeable-pavements.pdf>
4. Audit Question: *Is there a process for regular post-construction inspection of stormwater treatment practices for both private and publicly maintained facilities?*

5. Audit Question: *Do purpose statements in zoning specifically include language that encourages green infrastructure or naturalized drainage?*

Example Zoning Purpose Statement Referencing GSI:

Upper Gwynedd Township SALDO

<https://ecode360.com/10789654>

The management of stormwater on the site, both during and upon completion of the disturbances associated with the proposed subdivision or land development, shall be accomplished in accordance with the standards and criteria set forth in this section and in the Stormwater Management Ordinance set forth at Chapter 162 of this Code.

2. FLEXIBLE STANDARDS

1. Audit Questions: *Are green infrastructure practices suitable for high-density areas (ex. Tree boxes, sidewalk bioretention areas, curb bump-outs) allowed or encouraged in streetscapes? Are these practices allowed to extend into the ROW or onto sidewalks?*
2. Audit Question: *Is the use of deep-rooted or native plants, plants with habitat value, or edibles allowed or encouraged in the landscaping standards?*

Example Native Plant Lists:

Philadelphia Water Department's GSI Landscape Design Guidebook, Version 4, April 2020, Page 41: Plant selection section includes statement that "When selecting plants, consider the use of natives that would grow naturally in the local region. Native plants may not be appropriate for every situation in the urban environment given the site-specific location or design strategy, though should be used where effective." See guidebook including plant lists at http://documents.philadelphiawater.org/gsi/GSI_Landscape_Guidebook.pdf

Lower Makefield Township list of native plants required to be included in SALDO landscape plans (see <https://ecode360.com/attachment/LO1561/LO1561-178a%20Exhibit%201.pdf>):

- Includes trees, shrubs, ferns, grasses, herbaceous perennials and herbaceous emergent. Identifies light and moisture requirements and if street tree.

Montgomery County Planning Commission Sustainable Green Parking Lots Guidebook (see https://www.montcopa.org/DocumentCenter/View/9735/Green-Sustainable-Parking-Guide-2_10_2016-Web) Includes recommended plant lists for green parking lots including:

- Trees and shrubs for tree islands and planting strips with raised curbing
 - Trees for bioretention areas and moist soil areas
 - Shrubs – deciduous and evergreen suitable for bioretention areas and absorbent parking lot islands
 - Grasses and sedges for meadows, bioswales, and bioretention areas
 - Perennials for meadows, bioswales, and bioretention areas
3. Audit Questions: *Is there a process or standard to waive numerical, spacing, and species requirements from stormwater-control measure in required landscape areas? Is berming of*

setback and landscape areas along ROW required and/or habitually preferred as a method of visual screening?

4. Audit Questions: Do parking lot edge landscaping requirements (islands, edges) specifically allow or encourage use as stormwater control areas? Is a standard adopted? Are flush curbs and/or curb cuts allowed to direct runoff into vegetated landscaped islands?

Example Guidance and Code Language:

Montgomery County Planning Commission Sustainable Green Parking Lot Guide: Parking lot landscaped areas shall be designed to accept stormwater runoff and be designed as bioretention area if site conditions are appropriate. The bioretention area should have an inverted slope to allow infiltration and ponding of water. Curbs separating landscape areas from parking shall have cuts or other features to allow stormwater to flow to the bioretention area. Proposed bioretention area or other vegetated stormwater management features shall be depicted on the site development plans, along with enough details (area, depth of soil, plant species) to establish the viability of the proposed features. Plans should show how these stormwater management features within the parking lot are integrated with other stormwater management elements for the entire site.

City of Lancaster Ordinances:

Chapter 202 Parking Lot Ordinance: <https://ecode360.com/8118669>

Chapter 202-3-F: Landscaping and screening. All surface parking lots shall be designed and effectively landscaped and screened in accordance with standards for landscaping and screening in the Parking Lots Supplemental Specifications in addition to the following:

(1) General landscaping standards and guidelines.

(a) Landscaping shall be provided in low-lying or depressed perimeter landscape strips, interior planting islands and divider strips, as applicable, to minimize noise, glare and other nuisances as well as to enhance the environment and ecology of the site and surrounding area.

(b) Landscape areas shall be designed and constructed to provide stormwater management. Landscape areas shall incorporate green infrastructure (stormwater management) in order to comply with § 202-4 herein. Acceptable designs shall be consistent with Chapter 260, Stormwater Management, of the Code of the City of Lancaster.

(c) All landscape areas shall include a combination of trees, shrubs and ground covers.

(d) To the maximum extent practicable, native species of trees and other plant materials shall be provided.

(e) All trees shall be sited and planted in accordance with Chapter 273, Trees, of the Code of the City of Lancaster.

(f) Shrubs, ground covers and perennials used below shade trees within parking lots shall be of species able to withstand the harsh conditions and runoff of a parking lot. Plant selection should take into consideration tree growth and canopy cover and should be partially shade tolerant species.

(g) Provisions to prevent conflicts with the opening and closing of automobile doors and to reduce damage from automobile overhang.

(h) Trees shall be placed in order to avoid conflict with light standards and the effectiveness of light fixtures.

(i) Plantings required within the parking areas are exclusive of other planting requirements such as street trees.

(j) All damaged and dead landscape plantings, including trees, shall be replaced upon notice by the City.

(k) Continuous curbing including but not limited to formed concrete and rolled asphalt shall not be installed to impede the flow of stormwater into landscaped areas. The use of depressed concrete curbs is permitted.

(l) Replacement of trees. Where one or more required shade trees are proposed to be removed, they shall be replaced by new shade trees meeting City requirements, and the new locations and species shall be approved by the City. The Zoning Officer may require that the City Shade Tree Commission and/or the City Arborist be provided with an opportunity for a review. This provision does not apply to required street trees.

(m) Raised landscape and planting beds may be allowed upon permission of the City Engineer when used for accenting vehicle and pedestrian access points.

(2) Perimeter landscape strips shall be required for all surface parking lots with frontage on a public street and/or adjacent to residential dwellings.

(3) Planting islands shall be required for all surface parking lots containing 40 or more parking spaces.

(4) Vegetated divider strips may be utilized in surface parking lots with 100 or more spaces in lieu of planting islands. However, divider strips shall be used in all surface parking lots with double-loaded parking rows that exceed 40 spaces.

(5) In the event the tree planting or landscaping requirements in this subsection would result in the loss of the required number of off-street parking spaces as set forth in Article VIII of the City of Lancaster Zoning Ordinance, the number of trees and the area of landscaping may be reduced in accordance with the following:

(a) Enhanced SWM facilities shall be designed and constructed to reduce stormwater runoff by no less than an additional 20% above the amount required in § [202-4](#), herein; and

(b) There is no reduction in the number of off-street parking spaces as required in Article [VIII](#) of Chapter [300](#) Zoning, of the Code of the City of Lancaster.

Chapter 202-4: Adequate drainage:

- A. All accessory and commercial surface parking lots shall be drained in a manner which is consistent with the City's Stormwater Management Ordinance, Chapter [260](#) of the Code of the City of Lancaster.
- B. Stormwater management facilities shall be installed and maintained in accordance with all applicable governmental and manufacturer's standards.
- C. All new or reconstructed surface parking lots shall be designed to incorporate stormwater management BMPs that permanently remove stormwater runoff in accordance with Chapter [260](#), Stormwater Management, of the Code of the City of Lancaster.

(1) Any combination of SWM facilities may be incorporated for the control and management of stormwater runoff, including green infrastructure/low-impact development best management practices in accordance with the PA BMP Manual and the City Specifications Manual.

(2) SWM facilities, including green infrastructure, may be installed in series.

(3) Stormwater shall not be permitted to enter the sewer system in any area of the City of Lancaster with a combined sewer system without approval from the City Engineer.

- D. *All surface parking lots shall be properly graded and maintained to prevent conditions which may lead to water flowing over public sidewalks, standing water, ice or other conditions deemed to pose a threat to the public health, safety, and welfare.*

(1) Paved surfaces, including but not limited to parking spaces and drive aisles, shall be graded and sloped in such a way for directing stormwater into landscaped areas or other stormwater management facilities.

(2) Stormwater flows onto adjacent property shall in conformance with the performance standards in the City of Lancaster Stormwater Management Ordinance.

Raleigh, North Carolina ordinance (Identified through web search which noted Tetra Tech had helped the city create ordinances including GSI):

The City's [Unified Development Ordinance, 13th Supplement, August 2021 \(cld.bz\)](#) link to the Section 7.1.7 Vehicle Parking Lot Landscaping requirements provides details for perimeter, interior, and median islands including tree coverage.

***Design Guidelines for "Greening" Surface Parking Lots, Toronto City Planning, 2007 Draft** Select plant material that is suitable to the growing environment of the parking lot; use species (native and non-native) that are hardy, drought- and salt-tolerant, and resistant to the stresses of compacted soils and weather exposure; include suitable native species where possible and appropriate.*

5. Audit Question: *Is there a minimum size for parking lot landscape islands? Are there minimum landscaping requirements for parking lot perimeters or islands?*

Example Guidance:

Montgomery County Planning Commission Sustainable Green Parking Lot Guide:

- At least Minimum of 340 square feet for every 9 parking stalls and that the width of the islands measured face-of-curb to face-of-curb be a minimum of 9 feet.
- Minimum of 1,000 - 2,000 cubic feet or more of soil volume; that are needed for a larger tree to grow in confined rooting environments

6. Audit Question: *Can landscaped islands for stormwater treatment be created within cul-de-sac or medians?*

Example Guidance:

From PWD Plan Review: Chapter 6 – Utilizing Existing Site Features

Though cul-de-sacs and 'dead ends' are not encouraged in urban street design, they do exist within urban areas. In Philadelphia, dead end streets are prohibited, except as short stubs to permit future street extension into adjoining tracts, or when designed as a cul-de-sac. (§14-2104. Subdivision Design Standards.) Where cul-de-sacs are unavoidable, they can be designed with central islands that reduce impervious area and to allow for infiltration of stormwater runoff.

Design Overview

Careful cul-de-sac design can greatly reduce total impervious area and can create a stormwater management facility. Philadelphia Code stipulates, “Cul-de-sacs, permanently designed as such shall have at the closed end a turn-around containing a right-of-way having an outside radius of not less than 50 feet, which shall be paved to a radius of 40 feet.” (§14-2104)

A cul-de-sac can be designed to meet these standards and still provide stormwater management. An island can be designed in the center of a cul-de-sac that provides a sufficient travel lane but reduces impervious area and manages stormwater from the street and adjacent properties. The entire street should be graded to the central island to the extent that surrounding topography allows. The island would be designed like a bioretention facility and runoff can enter the island through curb openings or a curbless design.

Design elements

- Bioretention islands capture stormwater runoff.
- Flow controls direct stormwater from street and adjacent properties into the island.

From Viktor NY: https://www.victorny.org/DocumentCenter/View/809/Appendix-X_Jan-23-2012_Green-Infrastructure-Practices?bidId=

Another option for designing cul-de-sacs involves the placement of a pervious island in the center. Vehicles only travel along the outside of the cul-de-sac when turning, leaving an unused “island” of pavement in the center. These islands can be attractively landscaped and designed as bioretention areas to treat stormwater.

7. Audit Question: *Are street trees required or encouraged along streets?*
8. Audit Question: *Are parking ratios set as maximum or median (rather than minimum) requirements?*

Example Zoning, Parking Development Standards with Minimum and Maximum Criteria: City of Pittsburgh, PA Zoning

https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=PIZOCO_TITNIN_EZOZO_ARTVIDEST_CH914PALOAC_914.01GE

914.01.A Purpose

The purpose of these regulations is to:

1. Allow flexibility in addressing vehicle parking, loading, and access issues;
2. Present a menu of strategies to solve parking issues rather than parking space requirements;
3. Maintain and enhance a safe and efficient transportation system that is consistent with environmental goals and clean air; and
4. Ensure that off-street parking, loading, and access demands associated with new development will be met without adversely affecting other nearby land uses and surrounding neighborhoods.

914.02.A Schedule A

Off-street parking spaces shall be provided in accordance with the minimum and maximum standards included in Parking Schedule A. In lieu of complying with the standards of Parking Schedule A, an applicant may request approval of an Alternative Access and Parking Plan, pursuant to Sec. 914.07. The Zoning Administrator may require an Alternative Access and Parking Plan to be submitted for uses allowed in residential district. The parking schedule in this section shall not apply to the Bicycle Parking Requirement of Section 914.05.D.

Use Type	Minimum Off-Street	Maximum Off-Street
	Automobile Spaces Required	Automobile Spaces Allowed
Residential Uses		
Single-Unit, Detached	1 per unit	4 per unit
Single-Unit Attached	1 per unit	4 per unit
Two-Unit	1 per unit	2 per unit
Three-Unit	1 per unit	2 per unit
Multi-Unit	1 per unit	2 per unit
Group Residential	1 per 4 residents	No maximum
Housing for the Elderly	Parking Demand Analysis Required. see Sec. 914.02.B	

Schedule of Minimum and Maximum Off-Street Parking, Pittsburgh PA Zoning

9. Audit Question: *Are low-volume street sections, parking lanes along streets, or driveway aprons allowed or encouraged to be permeable?*
10. Audit Question: *Can Grasscrete be used to meet public safety and fire access needs?*

General information regarding various types of permeable pavement systems can be found at <https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement>
 Information regarding Grasscrete can be found at <https://www.sustainablepavingsystems.com/>
 (Note this does not imply endorsement of this specific product)

11. Audit Question: *Can traffic calming measures be co-designed as stormwater control measures?*

Code Revision: Allow traffic calming measures to be co-designed as stormwater control measures in Zoning Ordinance and/or SALDO. Include specific definitions of practices.

Stormwater Bumpouts

A bumpout is a landscaped extension of the street curb. Runoff water is directed underneath the system to be stored, infiltrated, and absorbed by plants, such as grasses, perennials, and shrubs.

A bumpout is a vegetated curb extension that protrudes into the street at mid-block or at an intersection. The system is composed of a layer of stone topped with soil and plants. An inlet or curb-cut directs runoff into the bumpout structure where it can be stored, infiltrated, and absorbed by the plants. Excess runoff is permitted to leave the system and flow to an existing inlet. The vegetation of the bumpout will be short enough to allow for open sight lines of traffic. Aside from managing stormwater, bumpouts also help with traffic calming. When located at crosswalks, they provide a safety benefit by reducing the pedestrian crossing distance. (Philadelphia Water Department).

Philadelphia Water Department – Bump-out Maintenance Guide:

(https://water.phila.gov/pool/GSI-Maintenance-Manual_v1.pdf)

Table 1-4. Stormwater Bump-out Routine Maintenance Tasks

Task	Description	Frequency	Protocol Reference
Remove trash, sediment, and organic debris	Remove trash, sediment, and organic debris from all SMP surfaces	Monthly	See 2.1.1; Section 2.1.1.10
	Wipe down signage	Monthly	See 2.1.1; Section 2.1.1.10
Winterize SMP	Clean and grease appurtenances	Annually in November	See 2.1.7; Section 2.1.7.10
	Place traffic delineation/snow removal bollards	Annually in November	See 2.1.7; Section 2.1.7.10
	Remove traffic delineation/snow removal bollards	Annually in April	See 2.1.7; Section 2.1.7.10
Apply mulch	Apply mulch to landscaped beds as needed	Annually in March	See 2.2.3; Section 2.2.3
Remove non-target/invasive vegetation	Remove non-target/invasive plants using one or more of the mechanical or chemical methods outlined in Tables 2-1 and 2-2	Monthly from March to November	For mechanical removal see 2.2.1; Section 2.2.3 or Table 2-1. For chemical removal see SOP 2.2.7; Section 2.2.3 or Table 2-2.
Cut back target perennials	Manually cut dead herbaceous vegetation from the previous growing season to 4-6 in. above the ground and ensure vegetation does not encroach onto the sidewalk and/or street	Annually in March	See 2.2.1; Section 2.2.1.10
Prune trees and shrubs	Elevate lower limbs and remove dead, rubbing, or crossing limbs	Annually, when trees are dormant between September and the end of December	See 2.2.6; Section 2.2.6.10
Water trees	Place water bag(s) on tree(s)	Annually in March for first 12 months after planting	See 2.2.2; Section 2.2.2.10
	Fill water bag(s)	Weekly, April - October for first 12 months after planting during any period of seven (7) or more days without rain	See 2.2.2; Section 2.2.2.10
	Remove water bag(s) from tree(s)	Annually in November	See 2.2.2; Section 2.2.2.10
Water herbaceous vegetation and shrubs	Water evenly and thoroughly at the base of vegetation so that the top of soil is saturated	Every four (4) days during any period of four (4) or more days without rain, June-August for the first 24 months after planting	See 2.2.2; Section 2.2.2.10
Vacuum clean structures	Remove trash/sediment/organic debris from subsurface access and flow control/conveyance structures	Annually	See 2.3.1; Section 2.3.1.10
Jet pipes	Jet conveyance, distribution, and underdrain pipes	Annually	See 2.3.2; Section 2.3.2.10

NACTO Urban Street Design Guide:

(<https://nacto.org/publication/urban-street-design-guide/street-design-elements/curb-extensions/gateway/>)

((Stormwater and traffic calming elements: <https://nacto.org/publication/urban-street-stormwater-guide/stormwater-elements/>))

A curb extension should generally be 1–2 feet narrower than the parking lane, except where the parking lane is treated with materials that integrate it into the structure of the sidewalk.

Curb extensions should be installed whenever on-street parking is present to increase **visibility**, reduce the crossing distance, provide extra queuing space, and allow for enhancements such as seating or greenery.

Combine stormwater management features, such as bioswales or rain gardens, with curb extensions to absorb rainwater and reduce the impervious surface area of a street.

12. Audit Question: *Is a standard review process defined for removing impervious surface?*
13. Audit Question: *Is there a process for identifying or requiring measures that reduce stormwater runoff when existing developed sites are modified, even if a full stormwater management plan is not required?*

Wissahickon Creek Act 167 Stormwater Management Ordinance, Appendix B Small Project Stormwater Management (SWM) Site Plan for Residential Development: This Small Project SWM Site Plan is included as an option for municipalities to adopt to give small regulated activities the opportunity to submit a non-engineered stormwater management plan.

14. Audit Question: *Are native plantings specifically allowed in front yards of lawn areas?*

The installation of native plants/meadows on front lawns can be complicated by township weed ordinances that require cutting of vegetation over a certain height. Some townships have addressed this issue with ordinances that provide exceptions for managing lawns in a more naturalized state:

Cheltenham Township, Montgomery County, Vegetation Ordinance 188-2:

Any weeds, tall grasses or noxious plants exceeding 12 inches in height, with the following exceptions:

Areas of any lot utilized for or managed as wildflower meadows, naturalized areas, or other no-mow zones, assuming the following requirements are met:

- The property owner has a documented and demonstrated management programs
- Minimum of 50 feet from streets is maintained free of weeds, grasses and noxious plants exceeding 12 inches
- Minimum of 25 feet from property line of abutting developed lot is maintained free of weeds, grasses and noxious plants exceeding 12 inches
- Within 25 feet of any structure of building or between the structure of building and the property (whichever is less) is maintained free of weeds, grasses and noxious plants exceeding 12 inches
 - Ornamental plants (Decorative plantings such as, but not limited to, hedges, evergreens, flowering shrubs and bushes)
 - Riparian buffers in the Riparian Corridor Conservation District

Overall, the regulations do not apply to open space conservation areas along stream banks; Township parkways, parks, or bird sanctuaries; or to heavily wooded or compost areas.

Springfield Township, Montgomery County Ordinance Chapter 11-1 - Accumulation of objectionable vegetation prohibited ([Township of Springfield, PA Brush, Grass and Weeds \(ecode360.com\)](http://Township of Springfield, PA Brush, Grass and Weeds (ecode360.com))).

- “No person, firm, or corporation in the township shall permit that growth or accumulation of weeds, tall grasses, or other objectionable vegetation...”
- The following areas shall be exempt from the requirements of this chapter except that noxious weeds shall be controlled within those areas: woodlands, wildflower gardens, meadows, steep slopes, wetlands, floodplains, riparian corridors, areas within 15 feet of a watercourse, pond or lake, an active farm field, pasture, and areas where stormwater management or conservation management plans have been established.

Pennsylvania State University Extension guidance - *Neighborly Natural Landscaping in Residential Areas*

Homeowners across America are changing the face of the typical American lawn. Learn strategies for the natural landscape homeowner who is looking for neighborly ways to garden for nature.

See [Neighborhoodly Natural Landscaping in Residential Areas \(psu.edu\)](http://Neighborhoodly Natural Landscaping in Residential Areas (psu.edu))

15. Audit Question: *Do allowable uses for parks and other open space areas specifically include stormwater retrofits or green infrastructure projects?*
16. Audit Question: *Are flexible dimensional criteria available for developers using planned development units, open space, or cluster design options?*

For more information on conservation design ordinances please see:

<https://conservationtools.org/guides/9-conservation-by-design>

17. Audit Questions: *Is cluster development open space managed for water quality benefits?*

3. INCENTIVES

1. Audit Question: *Is a shared parking agreement format, calculation, and administration procedure for changes in use, in place?*
2. Audit Question: *Are incentives provided to developers who reduce impervious cover, conserve natural areas, or implement stormwater reduction practices like green roofs, rain barrels and rain gardens?*

Example incentive types:

Stormwater Fee Discount: *Require a stormwater fee that is based on impervious surface area. If property owners reduce need for service by reducing impervious area and the volume of runoff discharged from the property, the municipality reduces the fee.*

Development Incentives: Offered to developers during the process of applying for development permits. Examples include zoning upgrades, expedited permitting, reduced stormwater requirements, and increases in floor area ratios.

Grants: Provide direct funding to property owners and/or community groups for implementing a range of green infrastructure projects and practices.

Rebates & Installation Financing: Provide funding, tax credits or reimbursements to property owners who install specific practices. Often focused on practices needed in certain areas or neighborhoods

Awards & Recognition Programs: Provide marketing opportunities and public outreach for exemplary projects. May include monetary awards.

Source: US EPA, *Managing Wet Weather with Green Infrastructure: Municipal Handbook, Incentive Mechanisms*. EPA-833-F-09-001. 2009
https://www.epa.gov/sites/default/files/2015-10/documents/qi_munichandbook_incentives.pdf

3. Audit Questions: *Is there a clear process for approving green infrastructure, flood management or environmental restoration projects? Would these projects be allowed in all zoning districts?*

4. SITE PLAN

1. Audit Questions: *Has the community identified historic stream channels and waterways? Are any of these features protected from modification or development?*
2. Audit Question: *Are there standards for outdoor storage areas?*
3. Audit Questions: *Is snow storage in bioretention areas prohibited or discouraged, unless the area is specifically designed for snow storage? Are snow storage areas required to be shown on site plans?*

Example Guidance Documents:

Massachusetts Department of Environmental Protection, Bureau of Water Resources, Snow Disposal Guidance, December 11, 2020. [download \(mass.gov\)](#)

Syntheses of Best Practices, Road Salt Management, Transportation Association of Canada, April 2013. [salt-1-plan.pmd \(tac-atc.ca\)](#)

4. Audit Question: *Is a consolidated plan for landscaping, grading/drainage and stormwater-control measures encouraged or required?*

5. EDUCATION

1. Audit Questions: *Has green infrastructure education been provided to staff involved in plan reviews? This includes staff in public safety, engineering, parks and recreation, economic development, and planning and zoning.*
2. Audit Question: *Has green infrastructure education been provided to planning boards and elected officials?*
3. Audit Question: *Is a review or procedure in place for downspout or foundation drain disconnection and rain barrel installation?*

Sample Guidance for Downspout Disconnection:

3 Rivers Wet Weather:

<https://www.3riverswetweather.org/green/green-solution-disconnected-downspout>

Pennsylvania American Water: Rain Barrel Installation: Step-by-Step Instructions:

<https://www.amwater.com/paaw/water-information/green-infrastructure/downspout-disconnection-instructions>

DC Water Downspout Disconnection Program: <https://www.dewater.com/projects/downspout-disconnection-program>

4. Audit Question: *Is a review or procedure in place for rain garden construction and planting native plants in yards and lawns?*
5. Audit Question: *Does the municipality have experience with permeable material, curbsless streets or other green infrastructure measures?*

General information regarding permeable systems along with other GSI practices are widely available. For example, see US EPA's Office of Water site:

<https://www.epa.gov/soakuptherain/soak-rain-permeable-pavement>

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