

Randolph, MA

ASSESSMENT OF CURRENT REGULATIONS

NPDES Phase II Small MS4 General Permit

June 2022

LID & GREEN INFRASTRUCTURE



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Prepared for: Town of Randolph, Massachusetts

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1.0 INTRODUCTION

This assessment has been developed by the Town of Randolph (the Town) to assess local requirements in relation to the creation of impervious cover and the feasibility allowing the use of low-impact-design (LID) and green infrastructure. This is done in accordance with the 2016 MS4 General Permit (the Permit) Stormwater Management in New Development and Redevelopment Section 2.3.6.b & c requirements and shall be part of the Town's Stormwater Management Plan (SWMP).

OBJECTIVE

The objective is to identify opportunities to revise municipal regulations to better support LID and green infrastructure options. As stated in the Mass Audubon tool, the key areas of analysis include:

1. Overall site design: Open Space Conservation Development (OSCD) vs. conventional subdivisions
2. Project design and layout standards in relation to LID: road layout and width, curbing, drainage, sidewalks, parking, landscaping
3. Maintenance and operations, mechanisms for enforcement: Who is responsible for maintaining drainage/LID (municipal or homeowner); easements, homeowner association option; municipal inspection and administration systems.

The following report sections summarize the current regulations and includes recommendations to update those regulations.

2.0 CURRENT REGULATIONS

The General Code for the Town is available to view here: <https://ecode360.com/RA1509>.

Regulations review as part of this task include:

- Chapter 200: Randolph's Zoning Bylaws (2021)
- Rules and Regulations Governing the Subdivision of Land (2020)
- Chapter 200: Randolph's Zoning Bylaws, Article XI Site Plan and Design Review (2021)
- Rules and Regulations Governing Applications to the Town Council for Site Plan and Design Review and Special Permits (2021)
- Chapter 195: Stormwater Management (2018)
- Stormwater Management Rules and Regulations (2018)

3.0 REVIEW STANDARDS AND METHODOLOGY

The analysis compares the existing regulations to the state's recommended best practices within the Smart Growth/Smart Energy Toolkit. This was completed using the tool developed by Mass Audubon: Bylaw Review for LID & Climate Smart, Nature-Based Solutions. The Excel tool provides a structured evaluation of the existing town regulations in a "Conventional", "Better" and "Best Practice" format in relation to over 30 best practice considerations. The tool can be downloaded from the following webpage:

<https://www.massaudubon.org/our-conservation-work/policy-advocacy/shaping-climate-resilient-communities/publications-community-resources/bylaw-review>

The tool includes a description of the assessment standards as follows.

OPEN SPACE RESIDENTIAL DESIGN (OSRD) OVERVIEW

This section reviews how local bylaws for cluster, Open Space Residential Design (OSRD), or Natural Resource Protection Zoning (NRPZ) compared to the state's recommended best practices. Communities may currently have multiple bylaws that cover this in different residential areas, in which case they can each be compared to the model regulations. However, in most cases, we would encourage simplification and the use of a single OSRD bylaw with local priorities clearly defined.

Communities may also have no cluster, OSRD, or NRPZ bylaws on the books. In this case, the state's best practice model can be used to create one. If the community closely follows the model, they'll meet the characteristics described within the analysis. However, the analysis still provides a quick checklist.

Some of the most important aspects of OSRD in any community include: the four-step review process that carefully considers the natural landscape before drawing lot lines; the minimum amount of open space protected; the incorporation of LID practices; and allowing this type of development by right instead of special permit.

ZONING, SUBDIVISION, SITE PLAN REVIEW, AND STORMWATER OVERVIEW

This section reviews not only the individual bylaws and regulations, but also how they work together and how consistent they are. Communities often update portions of bylaws or regulations in a piecemeal way over decades, leading to inconsistencies among various provisions. This color-coded analysis provides a quick overview of not only which rules are out of date and not meeting best practices for LID and preservation of Green Infrastructure, but also how certain topics (such as siting of LID) may be inconsistent between different parts of land use rules.

Not all factors (such as road width, siting of LID, limits on clearing and grading, or allowing common drives) may be addressed in each of the sections considered (Zoning bylaws, Subdivision Rules and Regulations, Site Plan Review (SPR), and Stormwater/LID bylaw). Where that factor is not usually included within a regulation or bylaw, you'll notice that "(Not Applicable)" will appear in that box. For example, setbacks and frontage requirements are addressed under Zoning, but often not under other bylaws or regulations.

This review may also help towns identify best practices that comply with MS4 permit requirements, issued by EPA and Mass DEP, though it is not comprehensive in relation to the permit requirements and additional actions may be needed. Consultation with EPA and/or DEP is strongly recommended. Visit www.mass.gov/guides/municipal-compliance-fact-sheet-stormwater for more info.

The analysis is broken into five goals, each with factors that address the goal:

Goal 1: Protect Natural Resources and Open Space

The focus of this section is to limit clearing and grading and encourage soil management, the use of native species, and revegetation of disturbed areas. Often, communities have language such as "due regard shall be shown for natural features" without any specific limitations or guidelines that can be used by local boards to ensure developers are following the true intent of the community. The retention of natural vegetation and soils is the single most efficient means of reducing development impacts on water resources, avoiding costs associated with piping and other "grey" stormwater management features as

well as the need for irrigation. There are also many other benefits – including habitat for birds and pollinators, trees for shade and clean air, and protection of natural scenery that contributes to property values and a high quality of life.

Goal 2: Promote Efficient, Compact Development Patterns and Infill

Often, making dimensional requirements such as setbacks, lot size, and frontage more flexible as well as allowing common drives will help allow the community to encourage efficient, compact designs. These help to decrease the amount of impervious surfaces and increase infiltration, while still supporting new development.

Goal 3: Smart Designs that Reduce Overall Imperviousness

This section reviews site design such as street location, road width, cul-de-sac design, curbing, roadside swales, and sidewalk design and location. There are many opportunities for communities to minimize impervious surfaces and allow for infiltration through curb cuts, swales, and cul-de-sacs with bioretention, among other things.

Goal 4: Adopt Green Infrastructure Stormwater Management Provisions

This section looks to explicitly discuss LID as a preferred method, such as requiring roof runoff to be directed into vegetated areas, and a preference for infiltration wherever soils allow or can be amended. Bylaws and/or regulations should clearly specify what LID is and which BMPs are preferred or required. Communities should also require an operations and maintenance plan to encourage effective use of LID methods. Adopting a specific LID bylaw can help clearly define and incorporate LID as a preferential stormwater management technique. Defining LID within this bylaw also decreases the need to explain LID throughout each of the Zoning bylaws, SPR, and subdivision rules and regulations and reduce the potential for any conflict between regulations and bylaws. This section also includes additional stormwater management considerations relevant to the MS4 permit.

Goal 5: Encourage Efficient Parking

Parking accounts for a large amount of impervious surface within new and redevelopment projects and offers an enormous opportunity for using LID. By reducing the amount of required parking - or even including parking maximums instead of minimums, communities can drastically reduce their impervious surfaces and runoff. Many communities already require landscaping in parking areas, which also offers an opportunity to allow curb cuts and infiltration in these areas - improving water quality and reducing the need for irrigation.

4.0 OPEN SPACE DEVELOPMENT ASSESSMENT

The Town regulates their open space with residential design through Planned Residential Development in §200-14.4 of the Zoning Bylaws. The Planned Residential Development bylaw lists the following objectives:

- 1) Planned Residential Development (PRD) allows an alternative pattern of residential land development to encourage innovation and variety in housing design and site development and to promote a variety of housing choices to meet the needs of a population diverse in age, income, household composition and individual needs;

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- 2) The standards in this section are intended to create a community of modestly sized dwelling units with commonly held community amenities and oriented around open space. These standards are intended to promote neighborhood interaction and safety through design while ensuring compatibility with neighboring land uses and surrounding properties;
- 3) PRD's provide opportunities for infill development that support the growth management goal of more efficient use of land.

These areas of open space development are an opportunity for towns to protect open space and incorporate LID practices in consideration of the natural landscape.

The Residential Development Analysis in Appendix A compares the Planned Residential Development to MA Best Practice Factors for Open Space Design based on various qualities that make the factor "Conventional", "Better" or "Best Practice". The rules included in the Town bylaw are color coded to match "Conventional", "Better" and "Best Practice" (orange, yellow, green, respectively) which correspond to the categories explained in Mass Audubon's tool. In addition to those colors, some items are highlighted in red. This indicates the existing bylaw falls below the conventional regulations.

As shown in Appendix A, 3 of the 18 factors are currently at best practices for open space residential design.

The Town exercises better practices in 7 factors:

1. Minimum parcel size is four times that required for non-PRD for zoning district, where better practice is to have 5-10 acre minimum and best practice is to have no minimum.
2. Review process is by cluster layout, where best practice is flexible "OSRD" 4 Step
3. Ownership in relationship with the resources present varies, where best practice includes providing open space in association with site resources
4. Quality of open space conserved includes reference to local conservation priorities with little specifics, where best practice includes mapped priority areas for site design
5. Contiguity of open space requires some documentation, where best practice requires specific plans, maps and comprehensive documents be included in the submission along with consideration of adjacent land.
6. Quality of open space conserved includes vague language regarding the use of the space, where best practice clearly lists allowed uses consistent with conservation and recreation goals
7. Relationship to open space or master plan goals vaguely discussed, where best practice requires consideration of open space goals of OSRP, master, and/or regional policy plan

The bylaw exercises conventional practices in 7 factors:

1. Special permit required where better practice is by right and best practice is mandatory
2. Quality of open space conserved includes vague language regarding submission of information on site resources and does not specify the process for the use of the data submitted, where best practice has specific plans, maps, and comprehensive data required and used as the basis for open space conservation
3. Inclusion of low impact design (LID) is not addressed where better practice encourages LID and best practices require LID be used

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4. Bonus incentive to increase number of units for affordability, where better practice includes bonus by special permit, and best practice allows for automatic or formulaic bonus for enhanced public benefits
5. Review entity is Town Council as special permit authority, where best practice requires Planning Board as the reviewing entity
6. Flexibility of open space to facilitate wastewater treatment facilities not provided, where better practice allows aggregated calculation by board of health, and best practice allows for the reduction of open space by up to 10% to accommodate sewer disposal with deed restriction and aggregate calculation
7. Monitoring of open space not specified, where best practice provides loose or nonspecific monitoring provisions, and best practice requires specific monitoring requirements at stated intervals

The bylaw exercised below conventional practices in 1 factor:

1. Minimum open space required is not specified, where conventional requires 50-65%, better practice is 65-75% and best practice is greater than 75%

5.0 BYLAWS AND REGULATIONS ASSESSMENT

Appendix B outlines the regulations in a similar format (“Conventional”, “Better”, and “Best Practice”) against sets of factors that address 5 goals. Findings for each regulation are color coded to match “Conventional”, “Better” and “Best Practice” factors. The 5 goals are:

1. Protect Natural Resources and Open Space
2. Promote Efficient, Compact Development Patterns and Infill
3. Smart Designs that Reduce Overall Imperviousness
4. Adopt Green Infrastructure Stormwater Management Provisions
5. Encourage Efficient Parking

This analysis indicates where specific requirements rate relative to best practices for LID and green infrastructure.

Each bylaw may cover different parts of each goal, so the analysis compared any differences between regulations as well.

6.0 RECOMMENDATIONS

As shown in Appendices A and B, there is room for improvement to better promote LID and green infrastructure within the Zoning Bylaws, Subdivision of Land Rules and Regulations, and Stormwater Management Regulations.

More acknowledgement and emphasis of the importance of natural green infrastructure will help limit stormwater impacts. This can be accomplished by implementing some or all the recommendations included below. Reference should be made to Appendices A and B for a complete analysis of areas that need improvement.

GENERAL COORDINATION OF BYLAWS AND REGULATIONS

To avoid current or potential conflicts and facilitate a consistent review of all projects to meet the best practices as it relates to stormwater management and low impact development (LID) techniques, it is recommended that the Stormwater Management Bylaw and/or Regulations be updated as outlined below and the Zoning Bylaw and Subdivision and other bylaws remove stormwater management design standards and instead provide a reference requiring compliance with the Towns stormwater management bylaw and/or regulations.

GOAL 1: PROTECT NATURAL RESOURCES AND OPEN SPACE

The following are factors the Town may want to consider to provide increase protection of natural resources and open space:

1. 1. Consider updating §200-14.4 Planned Residential development regulations to include more "better" and "best" practices outlined in Section 4.0 Open Space Development Assessment
1. 2. Require soil management plan as part of large developments
1. 3. Require at least 75% native plantings

GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL

The following are factors the Town may want to consider to promote efficient, compact development patterns and infiltration:

2. 1. Allow lot size, frontage and setbacks be set through OSRD process by right
2. 2. Allow common driveways in residential districts

GOAL 3: SMART DESIGNS THAT REDUCE OVERALL IMPERVIOUSNESS

The following are factors the Town may want to consider to promote smart designs that reduce overall imperviousness:

3. 1. Allow street location and right-of-way and roadway widths set through OSRD process by right
3. 2. Allow one-way loops
3. 3. Require bioretention at cul-de-sac islands
3. 4. Allow and encourage country drainage and or opening in curbing to all roadside swales/bioretention
3. 5. Allow and encourage permeable sidewalks or slope sidewalks to drain to lots

GOAL 4: ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS

The following are factors the Town may want to consider to including provision to promote green infrastructure stormwater management:

- 4.1. Allow pervious pavements in select conditions

GOAL 5: ENCOURAGE EFFICIENT PARKING

The following are factors the Town may want to consider to encourage efficient parking:

- 5.1. Restrict parking space size to (9 ft x 18 ft) and allow a percentage of smaller size (compact) spaces

- 5.2. Develop site design checklist to review project site constraints and require inclusion of LID techniques or infiltration

7.0 IMPLEMENTATION

It is encouraged that when changes are being made to any of the analyzed bylaws and/or regulations, the Town will consult this report to incorporate open space, green infrastructure, and reduction in impervious cover.

APPENDIX A

- Open Space Design Review Matrix

Best Practices Factors	Conventional	Better	Best Practice	Open Space Residential Design (OSRD) Regulations (\$200-14.4 Planned Residential Development of Zoning Ordinance)
Permit Type	Special Permit	By Right	Mandatory	By special permit (\$200.14.4C)
Land area to which the zoning is applicable	Only a small amount of developable land	Land of particular environmental sensitivity	All developable land zoned residential	All developable land zoned residential
Minimum Open Space	50-65%	65-75%	≥ 75%	Minimum not specified
Yield Calculation	Full plan with full percolation tests	Sketch plan with selected percolation test(s)	By formula	By formula. (\$200-14.4(F)(1))
Minimum parcel size	≥ 10 acres	5-10 acres	None	4 times that required for non PRD for zoning district. (\$200-14.4(E)(1)(b))
Review Process	No detailed analysis of site characteristics in relation to design	Cluster layout	Flexible "OSRD" 4 Step	75% of units must be in cluster layout around common open space. (\$200-14.4(G))
Ownership of Open Space	Appropriate to the resources present. For example, agricultural land by the farmer, watershed land by a water dept. or district, habitat land by the conservation commission, or recreational open space by a parks and recreation commission or homeowners association.			Varies. (\$200-14.4(L)(1)(b))
Dimensional Standards; area, frontage, etc.	Specified, < than for standard subdivision	Formulaic reduction with specified minimums	None set or small minimums	None set within the PRD. Specified increased density, which can further increase with affordability. (\$200-14.4(E), (F))
Quality of open space conserved: Specificity of local priorities for natural, cultural, and historic resource conservation	No indication of local conservation priorities, or language that refers only to regulated resource areas.	Lack of specificity regarding local conservation priorities; no map of priority locations	Local priorities clearly and unambiguously stated and mapped for use in site design.	Local priorities identified. (\$200-14.4(L))
Contiguity of open space; relationship to previously protected open space	No contiguity requirement	Contiguity required within subdivision	Contiguity required; adjacent land considered	No reference to previously protected open space, but must be accessible for residents within development. (\$200-14.4(L))
Quality of open space conserved: Allowed uses of open space	Allowed use of open space not addressed	Vague language regarding use of conserved open space	Clear list of allowed uses consistent with conservation and recreation goals	May be used for recreation, conservation or agricultural uses. (Zoning Ord. Section 200-14.4(L)(1)(a))
Quality of open space conserved: Submission requirements - GIS maps, data, etc. to inform the review process	Vague or no language regarding submission of information on site resources and no specified process for the use of the data submitted	General non-comprehensive data and mapping requirements; vague process for the application of the data to site design and open space conservation	Specific plans, maps, & comprehensive data regarding natural, cultural, and historic resources required and used as the basis for open space conservation	Vague language under the Conservation Commission's Report and Recommendations. (\$200-14.4(S)(3))
Relationship to Plans	Relationship to plans not discussed	Optional consideration of open space goals of OSRP, master, and/or regional policy plan	Required consideration of open space goals of OSRP, master, and/or regional policy plan	Vague language under the Planning Board's Report and Recommendations. (\$200-14.4(S)(2)(d))
Low Impact Design	Not addressed	Encouraged	Required	not addressed.
Density bonus for enhanced public benefit(s)	No bonus offered	Bonus by special permit	Automatic or formulaic bonus	density bonus for affordability. (\$200-14.4(R))
Review Entity	ZBA, council or selectmen as special permit authority	Planning Board	Planning Board	Town Council. (\$200-14.4(D)(2))
Flexibility re: open space protection to facilitate wastewater treatment facilities	No flexibility provided	Aggregate calculations allowed by board of health	If necessary, required open space may be reduced by < 10% to accommodate; disposal area deed restricted; aggregate calculations allowed by BoH, etc.	not addressed.
Monitoring of open space	No specified monitoring requirements and no requirements that would assist the party responsible for monitoring	Loose provisions to facilitate, municipal monitoring, or no specificity regarding monitoring interval	Specific provisions to aid endowed monitoring by a conservation org at stated intervals	No specified monitoring requirements; but open space must be enforceable by Town. (\$200-14.4(K)(3))

APPENDIX B

- Municipal Regulations Review Matrix

Factors	Conventional	Better	Best	Zoning (inc. Site Plan Review)	Subdivision Rules & Regulations	Stormwater/ Bylaw/Regulations
GOAL 1: PROTECT NATURAL RESOURCES AND OPEN SPACE						
Soils managed for revegetation	Not addressed	Limitations on removal from site, and/or requirements for stabilization and revegetation	Prohibit removal of topsoil from site. Require prep of soils compacted during construction	(Not applicable)	not addressed.	not addressed
Limit clearing, lawn size, require retention or planting of native vegetation/naturalized areas	Not addressed or general qualitative statement not tied to other design standards	Encourage minimization of clearing/grubbing	Require minimization of clearing/grubbing with specific standards	Preserve significant natural features. (§200-94(A)(1), (B)(1)); Retain native plantings strongly encouraged. (§200-94(B)(2)(g)(2))	Preserve natural features where possible. (§VIII(L))	minimize land disturbance for erosion control. (Regs §6(F))
Require native vegetation and trees	Require or recommend invasives	Not addressed, or mixture of required plantings of native and nonnative	Require at least 75% native plantings	not addressed.	recommend reviewing list of suggested street trees for invasives recommendations. (Appendix C)	not addressed.
GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL						
Lot size	Required minimum lot sizes	OSRD/NRPZ preferred. Special permit with incentives to utilize	Flexible with OSRD/NRPZ by right, preferred option	Required minimum lot sizes. Zoning Table of Dimensional Requirements.	(Not applicable)	(Not applicable)
Housing density	Multi-family housing not allowed, or only in/adjacent to commercial and industrial uses	Multi-family and cluster developments allowed by special permit	Multi-family housing allowed by right in most residential areas; cluster developments encouraged with density bonuses for LID features and no maximum lot coverage	Special Permit required. Zoning Table of Allowable Activity.	(Not applicable)	(Not applicable)
Setbacks	Required minimum front, side, and rear setbacks	Minimize, allow flexibility	Clear standards that minimize and in some instances eliminate setbacks	Required minimums. Zoning Table of Dimensional Requirements.	(Not applicable)	(Not applicable)
Frontage	Required minimum frontage for each lot/unit	Minimize especially on curved streets and cul-de-sacs	No minimums in some instances, tied into other standards like OSRD design and shared driveways.	Required minimum. Zoning Table of Dimensional Requirements.	(Not applicable)	(Not applicable)
Common driveways	Often not allowed, or strict limitations	Allow for 2-3 residential units	Allow for up to 4 residential units, preferably constructed with permeable pavers or pavement	not addressed.	not addressed.	(Not applicable)

Factors	Conventional	Better	Best	Zoning (inc. Site Plan Review)	Subdivision Rules & Regulations	Stormwater/ Bylaw/Regulations
GOAL 3: SMART DESIGNS THAT REDUCE OVERALL IMPERVIOUSNESS						
Impervious cover limits and infiltration rates	Not usually addressed in zoning and subdivision regs for rural/suburban residential	Require no net increase in site run-off from pre- to post-development	Impervious cover limits tailored to the community and district type (i.e. <10% total impervious cover in rural districts, but higher in urban and redevelopment districts); post-development infiltration should be equal to or greater than pre-development. Following best practice may also help communities comply with MS4 permit requirements	impervious cover limits (vary by district). See Zoning Table of Dimensional Requirements.	No change from pre-development drainage. (§IX(A))	No net increase in site runoff. (Regs §3(A)(8))
Street location	Numeric and geometric standards based primarily on vehicular travel and safety, with basic pedestrian requirements e.g. sidewalks	Flexibility in applying standards, to reduce area of impact, grading, avoid key natural features	OSRD design preferred by-right. Require locating streets to minimize grading and road length, avoid important natural features	(Not applicable)	based primarily on vehicular travel. (§VIII(B4))	(Not applicable)
Road width	Major and minor categories, 24-30'	Wide, medium, narrow categories. 22-24' max, plus 2' shoulders	Wide, medium, narrow, and alley categories. 20-24' widest for 2 travel lanes, 18-20' low traffic residential neighborhood, plus 2' shoulders. Allow alleys and other low traffic or secondary emergency access and all shoulders to use alternative, permeable materials.	(Not applicable)	20-30' (§VIII(B5))	(Not applicable)
Road ROW width	50-75', fully cleared and graded	40-50', some flexibility in extent of clearing	20-50' depending on road type	(Not applicable)	40-50' (§VIII(B5))	(Not applicable)
Access Options	No common drives allowed, dead end allowed with limit on length and # of units	Allow dead end with limit on length and # of units. Allow common drives up to 2-3 units	Allow one way loop streets. Allow common drives up to 4 units, and alleys and rear-loading garages where suitable.	(Not applicable)	Dead ends min length of 250', max of 600'. (§VIII(B7))	(Not applicable)
Dead Ends/Cul-de-sacs	120 ft or more minimum turnaround	Minimize end radii – 35 ft	Allow hammerhead turnaround	(Not applicable)	Hammerhead allowed for subsidiary streets; 50-60' min turnaround. (§VIII(B7e), (C))	(Not applicable)
Cul-de-sacs	Full pavement standard	Encourage center landscaping with bioretention	Require center landscaping with bioretention	(Not applicable)	Full pavement standard (App. G), mention of center islands allowing drainage from street (§VIII(M9))	(Not applicable)
Curbing	Curbing required full length both sides of road	Allow curb breaks or curb flush with pavement to enable water to flow to vegetated LID features	Open drainage with roadside swales and no curbs preferred	(Not applicable)	Curbing required full length, both sides. (§VIII(I))	not addressed
Roadside Swales	Allowed as an option	Preferred over closed drainage	Preferred, with criteria for proper design. Adoption of technical specifications and design templates for green infrastructure recommended	(Not applicable)	Allowed. (§VIII(D19); §IX(C))	
Utilities	Off sets required contributing to wide road ROWs	Not specified, flexible	Allow under road, sidewalks or immediately adjacent to roads to enable placement of roadside swales.	(Not applicable)	Allowed within ROW. (§VIII(E)), (App. G)	(Not applicable)

Factors	Conventional	Better	Best	Zoning (inc. Site Plan Review)	Subdivision Rules & Regulations	Stormwater/ Bylaw/Regulations
Sidewalks	Concrete or bituminous	Some flexibility in material and design	Prefer permeable pavement or permeable pavers	(Not applicable)	Cement/bituminous. (§VIII(H), (L))	(Not applicable)
Sidewalk location	Required both sides of road	Allow on only 1 side of road especially in low density neighborhoods	Prefer siting with land contours and for best pedestrian utility (e.g. connect with common areas and shared open spaces) – not necessarily immediately parallel to road.	(Not applicable)	Allowed on 1 side of road on secondary streets. (§VIII(H))	(Not applicable)
Sidewalk drainage	Drains to road closed drainage system	Not addressed	Disconnect drainage from road system – e.g. Adjacent green strips or within vegetated areas that can absorb sheet flow	(Not applicable)	not addressed.	(Not applicable)

Factors	Conventional	Better	Best	Zoning (inc. Site Plan Review)	Subdivision Rules & Regulations	Stormwater/ Bylaw/Regulations
GOAL 4: ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS						
Rooftop runoff	Prohibit directing clean roof runoff into closed municipal drainage systems.	Allow clean roof runoff to be directed to landscaped or naturally vegetated areas capable of absorbing without erosion, or infiltration	Require directing clean roof runoff to landscaped or naturally vegetated areas capable of absorbing, or infiltration	(Not applicable)	Must comply with MA Stormwater Handbook and Town Stormwater Management Bylaw/Regs and LID must be implemented to max extent practicable (§IX(A))	not specifically addressed, No net increase in site runoff. (Regs §3(A)(8))
Overall stormwater design; piping and surficial retention vs. LID	Conventional stormwater system design standards	Encourage LID features and BMPs; design standards often not specified	LID design standard encouraging infiltration, allowing surficial ponding of retained runoff for up to 72 hours; systems designed for larger volume storms, accounting for future precipitation predictions; credit for green roofs towards stormwater requirements. Following best practice may also help communities comply with MS4 permit requirements	(Not applicable)	LID/preservation of natural features and drainage encouraged. (§VIII(A)) Must comply with MA Stormwater Handbook and Town Stormwater Management Bylaw/Regs and LID must be implemented to max extent practicable (§IX(A))	LID must be implemented where adequate soil, groundwater, topographic conditions allow (Regs §6(B)), Meets and exceeds MS4 design requirements. (Regs App. B)
Site Plan/Design Requirements	LID not addressed	Encourage use of LID features in site design - such as reduced imperviousness, maintaining natural hydrology, preserving open space, and rainwater reuse	Include bioretention and other vegetated LID features in site landscaping/open space requirements. Following best practice may also help communities comply with MS4 permit requirements. See section 2.3.5 of the MS4 permit for more information	(Not applicable)	LID/preservation of natural features and drainage encouraged. (§VIII(A)) Must comply with MA Stormwater Handbook and Town Stormwater Management Bylaw/Regs and LID must be implemented to max extent practicable (§IX(A))	LID must be implemented where adequate soil, groundwater, topographic conditions allow (Regs §6(B)), Meets and exceeds MS4 design requirements. (Regs App. B)
Allow easy siting of LID features (bioretention, swales, etc.)	Often not addressed, may require waivers from subdivision standards	Encouraged along road ROW	Allowed on lots, common open space, or road ROW, easement recorded. For commercial development, allow an increase in floor area ratio or other developmental incentives for green roofs	not addressed.	Allowed on its own individual lot with ownership and responsibility to entity approved by Planning Board with easements granted to entity owning the street (§IX(C))	(Not applicable)
Permeable paving	Often not addressed, may require waivers from subdivision standards	Allowed on private residential lots for parking, patios, etc.	Allowed for residential drives, parking stalls, spillover parking spaces, emergency access ways (with proper engineering support for emergency vehicles) Two track design allowed for driveways and secondary emergency access ways (where required)	(Not applicable)	not addressed	not specifically addressed.
Stormwater management O&M plan	Typically only addressed if municipality has a stormwater or LID bylaw, or for areas subject to wetlands permitting	Required	Required, contents specified in alignment with current MassDEP Stormwater Handbook. Following best practice may also help communities comply with MS4 permit requirements	(Not applicable)	Required. (§IX(D))	Required. Contents specified. (Regs §6(G), App. E)

Factors	Conventional	Better	Best	Zoning (inc. Site Plan Review)	Subdivision Rules & Regulations	Stormwater/ Bylaw/Regulations
Construction Erosion and Sedimentation Plan, and stormwater control	Basic general requirements	Required, contents specified - the site design process should include soil erosion and sedimentation control measures	Goes beyond minimum NPDES requirements. Requires minimization of site disturbance, reduction of construction waste, control measures not removed until proof of soil stabilization or reestablishment of vegetation. Written procedures for site inspection and enforcement included. Following best practice may also help communities comply with MS4 permit requirements. See section 2.3.5 of the MS4 permit for more information	(Not applicable)	Required. (§X(C))	Required, contents specified. (Regs §9(F) & App D) includes Minimization of site disturbance. Procedures for Inspection and Site Supervision and Enforcement included (Regs §10)
Stormwater discharge detection & elimination	Not addressed	Discharges and connections noted and/or limits set on quantity and quality	Illicit discharges and connections are prohibited and enforced. Following best practice may also help communities comply with MS4 permit requirements. Find more information in section 2.3.4.a of the MS4 permit	(Not applicable)	(Not applicable)	Prohibited and enforced. (Chpt 195. Article II of Stormwater Ordinance)
Post- construction stormwater management and drainage patterns	Not addressed	Allow LID	Resemble pre-existing conditions of volume, velocity, quality and location, as nearly as possible, requiring LID to the max extent feasible. Retain vol of runoff >1in. per sq.ft. of impervious surface and/or remove 90% TSS post-construction & 50% TP generated on the site for new development, or >0.8in. per sq.ft and/or remove 80% TSS and 50% of TP load for redevelopment. Following best practice may also help communities comply with MS4 permit requirements.	(Not applicable)	Resemble preexisting conditions. LID used to max extent feasible. (§IX(A))	Resemble preexisting conditions, retention requirements comply with MS4. LID used unless infeasible. (Regs. App. B, §3(A)(1), (8))
As-built surveys	Not addressed	Recommended	Required, with written instructions for process; electronic submittal allowed	Required, with instructions. (§200-95)	Required, written instructions. (§XI(C))	Required with instructions. (Regs. §11)

Factors	Conventional	Better	Best	Zoning (inc. Site Plan Review)	Subdivision Rules & Regulations	Stormwater/ Bylaw/Regulations
Intra-departmental communication and coordination	Not addressed	Informally or loosely occurring	Required for plan review and/or permit approvals	Applications and plans for site plan and design review to Town Council rely on Planning Board for review. Planning Board's findings are provided to all departments including Building, Conservation, DPW, Engineering, Fire and Health (\$200-93)	Requires review and approval by Board of Health and written review statements from Public Works, Fire Dept, Building Dept and Conservation Commission (\$V(C & E))	Notification of application to all departments and boards for opportunity to review. (Regs. §8 (C))
Enforcement	No	Yes	Yes with fines. Same entity should oversee permit approvals and enforcement	Yes, no permanent occupancy permits issued until as-built plans are provided and verified that improvements were constructed and are functioning as approved. (\$200-95)	Performance guarantee required prior to endorsement of Definitive Plans (\$XII)	Yes with reimbursement of costs and fines. (Chpt 195-19 of Stormwater Ordinance) Also security or performance bond requirements (Regs. §9)

Factors	Conventional	Better	Best	Zoning (inc. Site Plan Review)	Subdivision Rules & Regulations	Stormwater/ Bylaw/Regulations
GOAL 5: ENCOURAGE EFFICIENT PARKING						
Parking	Specific minimums set based on projected maximum use times	Encourage minimum # needed to serve routine use (e.g. 2/residential unit with any additional/visitors parking behind in driveway or on street).	Establish Maximum Parking spaces allowed. Do not require more than 2/residence. Allow tenants separate, optional lease agreements for parking.	Specific mins based on use and zone (no more than 2 per residence). Max set for PRDs. Minimum space dimensions 9'x18'.	(Not applicable)	(Not applicable)
Commercial Parking	Specific minimums set based on projected maximum use times adding all on-site uses together.	Some flexibility to reduce minimums based on street or other available nearby parking or transit.	Allowed shared parking for uses with different peak demand times. Provide model agreements/deed restrictions. Reduce parking requirements near transit. Limit parking stall size (9ftx18ft max), with up to 30% smaller for compact cars	Specific mins, with flexibility based on employer transit incentives, shared uses with diff. peak demands.	(Not applicable)	(Not applicable)
LID in Parking Areas	Often not addressed, may require waivers e.g. for planting islands to drain down rather than built up surrounded by curbs	Allow LID/bioretenion within parking areas.	Require landscaping within parking areas, as LID/bioretenion, at a minimum of 10% of the interior area landscaped and a minimum of 25 square feet for island planting areas.	Landscaping within parking areas required. Alternative parking lot designs incorporating natural resources encouraged. (§200-94(B)(2)(f-h))	not addressed.	Not specifically addressed. LID required for all applicable projects unless infeasible. (Regs. App B)