

Analysis of Local Land Use Regulations in Relation to LID

Grafton, Massachusetts

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Prepared by:

Mass Audubon ♦ The Central Massachusetts Regional Planning Commission



Overview

The following analysis was prepared by the Central Massachusetts Regional Planning Commission (CMRPC) and Mass Audubon as part of a technical assistance project, Nutrient Reduction through Innovative Land Use Techniques: Overcoming Municipal Implementation Barriers. The project provides training and technical assistance to communities in the Massachusetts portion of the Blackstone Watershed to apply cost-effective Low Impact Development (LID) techniques. Specifically, this report evaluates selected land use regulations in the Town of Grafton in relation to models and examples from the Commonwealth of Massachusetts' Smart Growth/Smart Energy Toolkit and other sources in relation to the use of LID and Green Infrastructure (GI) techniques in development. The focus is primarily on residential development.

Best practices minimize the alteration of natural green infrastructure such as forests; minimize creation of impervious surfaces; support retention of substantial naturally vegetated buffers along wetlands and waterways; minimize grading and alterations to natural flow patterns; and support the use of LID techniques as the preferred, most easily permitted methods for managing stormwater.

Key areas of analysis (see charts below)

1. Overall site design: Open Space Residential Design (OSRD) 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 (regardless of who is responsible this is needed)

Summary findings/recommendations:

Overall, the Town of Grafton has taken some steps to allow for LID, such as encouraging its use within the Conservation Commission Regulations Governing Stormwater Management, but allowance of LID-related measures are still lacking in other areas of regulation and bylaws. The charts below specify where LID and GI can be encouraged throughout the community's bylaws and regulations to encourage future development towards smart growth.

In general, both the zoning bylaw and the subdivision rules and regulations often cite numerous other sections, creating unnecessary complication and potential confusion. It may be clearer to potential developers, citizens, and others to simply state "as required under the issuance of a special permit in section 1.5" vs "under section 1.5." Often reading through one section requires significant time finding and referencing several other documents to ensure all requirements are understood and met.

Similarly, having one topic split into multiple sections may also create confusion and potential contradiction. For example, siting of utilities in relation the right of way is discussed in three sections with varying requirements and prohibitions. While §4.7.1.3 requires utilities minimum of 2' outside of back edge of sidewalk, §4.7.4 allows gas mains to be installed under the sidewalk or under the grass strip, and §5.3.2 requires sewers to be installed in the center of the street as nearly as practicable. This sort of confusion may be avoided by streamlining the bylaws and regulations to reduce redundancy and contradiction.

Grafton's Site Plan Review includes no mention of low impact development, impervious surface area, environmental impact, working within the natural landscape, or other components of smart growth While it requires applicants submit location of existing water bodies and proposed percentage of pavement and open space as well as stormwater management, it gives no recommendations to how the town would like development to occur. Editing this section of zoning bylaws offers the opportunity to¹ guide smart development in Grafton.

The town's Flexible Development can similarly be retrofitted with additional language surrounding low impact development and more flexibility to allow for the best design possible. Offering a significant bonus is a strong way to encourage

¹ The Town of Ashburnham's Site Plan Review may offer a good example for Grafton.

developers to meet all of the design criteria, but requiring more of these criteria instead of offering them as extra considerations – as well as allowing for this type of design by right – will go a long ways in shaping Grafton’s future development.

OSRD Analysis

The following chart compares Grafton’s Flexible Development to the state’s Open Space Residential Design Model By-law.

<u>MA Open Space Residential Design Best Practices Factors</u>	<u>Fair</u>	<u>Good</u>	<u>Best Practice</u>	<u>Grafton Flexible Development</u>
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<u>Permit Type</u>	Special Permit	By Right	Mandatory	Special Permit
<u>Land area to which the zoning is applicable</u>	Only a small amount of developable land	Land of particular environmental sensitivity	All developable land zoned residential	All developable land zoned residential
<u>Minimum Open Space</u>	50-65%	65-75%	≥ 75%	40-50% (40% in R-20 and R-40; 50% in Agricultural) – half must be upland, half may be wetland buffer)
<u>Yield Calculation</u>	Full plan with full percolation tests	Sketch plan with selected percolation test(s)	By formula	Plan with results of deep soil test pits and percolation tests – must be same number of lots as found in conventional development
<u>Minimum parcel size</u>	≥ 10 acres	5-10 acres	None	None
<u>Review Process</u>	No detailed analysis of site characteristics in relation to design	Cluster layout	Flexible “OSRD” 4 Step	Cluster layout
<u>Ownership of Open Space</u>	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.			Common land may be conveyed to Town, nonprofit of OS conservation, corporation or trust (with town maintenance), or retained by owner. If not owned by town of Grafton, must have CR in perpetuity.
<u>Dimensional Standards; area, frontage, etc.</u>	Specified, < than for standard subdivision	Formulaic reduction with specified minimums	None set or small minimums	Specified. R-20: Minimum lot 8,000sf, R-40: 12,500sf, Ag 20,000 sf. Frontage 80', setback 15-20 ft, side yard setback 7 ft, rear yard setback 15'

<u>MA Open Space Residential Design Best Practices Factors</u>	<u>Fair</u>	<u>Good</u>	<u>Best Practice</u>	<u>Grafton Flexible Development</u>
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<u>Quality of open space conserved: Specificity of local priorities for natural, cultural, and historic resource conservation</u>	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.	Preserve and maintain existing agricultural lands, 100' riparian buffers, habitat of endangered species, historical areas, and recreational areas within Town's OS and Recreation Plan.
<u>Contiguity of open space; relationship to previously protected open space</u>	No contiguity requirement	Contiguity required within subdivision	Contiguity required; adjacent land considered	Should be "reasonably contiguous" as part of existing OS in community – part of design consideration providing density bonus if more measures met.
<u>Quality of open space conserved: Allowed uses of open space</u>	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	Design criteria list some examples (ag land, riparian buffer, historic sites, etc) but does not give a list of allowed uses.
<u>Quality of open space conserved: Submission requirements - GIS maps, data, etc. to inform the review process</u>	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.	Not addressed

<u>MA Open Space Residential Design Best Practices Factors</u>	<u>Fair</u>	<u>Good</u>	<u>Best Practice</u>	<u>Grafton Flexible Development</u>
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<u>Relationship to Plans</u>	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	Location of active recreational areas should consider the Town's OS and Recreational Plan. Design should preserve scenic views of special places designated within OSRP.
<u>Low Impact Design</u>	Not addressed	Encouraged	Required	Not addressed
<u>Density bonus for enhanced public benefit(s)</u>	No bonus offered	Bonus by special permit	Automatic or formulaic bonus	Formulaic bonus 15-25% increase by meeting some/all of design guidelines
<u>Review Entity</u>	ZBA, council or selectmen as special permit authority	Planning Board	Planning Board	Planning Board
<u>Flexibility re: open space protection to facilitate wastewater treatment facilities</u>	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
<u>Monitoring of open space</u>	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. @ stated intervals	No specified monitoring requirements

Zoning, Subdivision, Site Plan, and Stormwater Analysis

	Best Practices Guidelines			Grafton Regulations			
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
DIMENSIONAL REQUIREMENTS							
Lot size	Required minimum lot sizes	OSRD/NRPZ preferred. Special permit with incentives to utilize	Flexible with OSRD/NRPZ by right, preferred option	Minimum lot area 1 acre - except within Campus Development Overlay (CDO)	NA	NA	NA
Setbacks	Required minimum front, side, and rear setbacks	Minimize, allow flexibility	Clear standards that minimize and in some instances eliminate setbacks	Minimum 40' front yard, 35' side/rear yard - except within Campus Development Overlay (CDO)	NA	NA	NA
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 drive-ways.	100' min frontage, 150' min width - except within Campus Development Overlay (CDO)	NA	NA	NA
Common drive-ways	Often not allowed, or strict limitations	Allow for 2-3 residential units	Allow for up to 4 residential units	Allowed, specifics not discussed.	Allowed for up to 3 units.	Not addressed	Not addressed

	Best Practices Guidelines			Grafton Regulations			
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
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	Not addressed	Not addressed other than under 4.5 Protection of Natural Features to be maximized, but no specifics.	Not addressed	Additional Design Criteria – specifies landscape design should minimize need for irrigation and allow for natural recharge and native species.
Limit impervious area – Rural Districts In high density areas, require post-development infiltration to = or > predevelopment	Not usually addressed in zoning and subdivision regs for rural/suburban residential	<15%	<10%	Not addressed, other than in CDO, where <60%	Not addressed.	Not addressed	Better site design includes GI and reducing impervious cover, though no requirements.
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	Not addressed	Not addressed (although seemingly prohibited by requirement of swales and prohibition of pooling stormwater)	Not addressed	LID encouraged to minimize reliance on structural storm-water management. Assumed to be throughout, not just ROW.

Best Practices Guidelines				Grafton Regulations			
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
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 addressed	Not addressed	Not addressed	Not addressed
Residential 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	Specific minimums, including 2/residential unit (single or double family)	Not addressed	Not addressed	NA

Best Practices Guidelines				Grafton Regulations			
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
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 minimums based on projected use. SP may allow decrease by 30% in number of spaces due to "special nature of a use or building" but PB may also require increase up to 20% in required parking	NA	Not addressed	NA
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/bioretention within parking areas	Require landscaping within parking areas, as LID/bioretention	Parking areas with >5 spaces must have one tree per five spaces in parking area, though required to be in curb or berm protective plots, which cannot be paved with impervious material.	NA	Not addressed	Not addressed

	Best Practices Guidelines			Grafton Regulations			
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
Site Plan Requirements	LID may not be addressed	Encourage use of LID features in site design	Count bioretention and other vegetated LID features toward site landscaping/open space requirements.	NA	NA	Not addressed	LID encouraged
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	NA	Not addressed	Not addressed	Not addressed
Overall stormwater design; piping and surficial retention vs. LID	Conventional stormwater system design standards		Allow surficial ponding of retained runoff for up to 72 hours	NA	4.7.8.3 Prohibit temporarily ponded runoff	Not addressed – assumed conventional design	LID is encouraged, assumed to allow surficial ponding.
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, surficial bioretention and swales preferred. Closed/underground systems requiring specialized inspection and clean out discouraged.	NA	Not addressed	NA	Required, non-structural LID encouraged.

Best Practices Guidelines				Grafton Regulations			
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
Construction Erosion and Sedimentation Plan required	Basic general requirements	Required, contents specified	Meets NPDES requirements	NA	Note potential dangers of impacts of erosion/sedimentation, but no specifics.	NA	Includes BMPs or equivalent runoff and erosion/sedimentation measures
SUBDIVISION RULES AND REGULATIONS/ROAD DESIGN STANDARDS							
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	NA	Basic requirements to provide safe vehicular and pedestrian travel. Attractive curvilinear layout. Design conforming to Master Plan.	NA	NA
Road width	Major and minor categories, 24-30'	Wide, medium, narrow categories 22-24' max, plus 2' shoulders	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	NA	Major 38' Minor A – 30' 4" Minor B – 26' Minor C – 22'	NA	NA

	Best Practices Guidelines			Grafton Regulations			
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
Road ROW width	50-75', fully cleared and graded	40-50', some flexibility in extent of clearing	20-50' depending on road type	NA	Major – 60' Minor – 50' PB may require additional width	NA	NA
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	NA	Allow common drives with up to 3 units; dead ends must be 150-500'	NA	NA
Dead Ends/Cul-de-sacs	120 ft or more minimum turnaround	Minimize end radii – 35 ft	Allow hammer-head turnaround	NA	100' minimum turnaround radius plus an additional snow easement of 15' deep x30' wide	NA	NA
Cul-de-sacs	Full pavement standard	Encourage center landscaping with bioretention	Require center landscaping with bioretention	NA	Not addressed.	NA	NA

				Best Practices Guidelines				Grafton Regulations				
				Conventional Approach	Better	Best			Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
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					NA	Streets in non-residential subdivision and all Major Streets (and other streets meeting certain grade/curve requirements) require granite curbing on both sides along full length. Where not required, bituminous low profile "Cape Cod" berm is required along full length.	Not addressed	Not addressed	
Roadside Swales	Allowed as an option	Preferred over closed drainage	Preferred, with criteria for proper design.					NA	Prohibited – 4.3.5 – Driveways or other curb openings shall be designed so that surface runoff can neither enter nor leave the road ROW.	Not addressed	Not addressed	

				Grafton Regulations			
Best Practices Guidelines							
	Conventional Approach	Better	Best	Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs
Utilities	Off sets required contributing to wide road ROWs		Allow under road, sidewalks or immediately adjacent to roads to enable placement of roadside swales.	NA	4.7.1.3 Utilities are required minimum of 2' outside of back edge of sidewalk. 4.7.4 Gas mains may be installed under the sidewalk or under the grass strip. 5.3.2 Sewers shall be installed in the center of the street as nearly as practicable. 5.3.7 Phone, cable tv, and fire alarm systems maybe in the same trench as other utilities with vertical and/or horizontal separation. (Reconcile)	Not addressed	NA
Sidewalks	Concrete or bituminous	Some flexibility in material and design	Prefer permeable pavement	NA	5.5 Concrete required.	Not addressed	Not addressed

				Best Practices Guidelines				Grafton Regulations							
				Conventional Approach	Better	Best					Zoning	Subdiv Regs	Site Plan	Storm-water/LID Bylaw/Regs	
Sidewalks	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.					NA		4.9.1 Required on the full length of the street. 4' wide. One side for Minor Streets; both sides for Major Streets.		Not addressed		Not addressed	
Sidewalks	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					NA		Not addressed		Not addressed		Not addressed	
SITE WORK															
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 rototilling and other prep of soils compacted during construction					NA		General bylaw Article 13 Section 4A requires at least 4" of topsoil to remain be replaced (except where impractical such as during roadway construction).		Amount of soils removed must be documented, but no preference noted.		Hydrologic calculations must provide provision for protecting infiltration capacity of soil as well as erosion control, but no mention of revegetation.	

Zoning, Subdivision, Site Plan, and Stormwater Analysis

Additional Notes

Funding and Maintenance:

- Ensure sufficient funding for DPW to perform maintenance of stormwater management facilities, whether conventional or LID.
- Consider reduced costs of paving, plowing, salt when comparing LID maintenance costs with conventional designs
- Create mechanisms for enforcement of maintenance agreements; establish regulations/fines for property owners who fail to maintain stormwater facilities.

Street trees: Check that all species are native and pollinator friendly such as those listed here:

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_015043.pdf

Training:

- Provide opportunities for and encourage municipal staff and committee/board members to participate in LID workshops or conferences.

Nonpotable uses of clean stormwater:

- Local plumbing codes should allow the use of clean (e.g. rooftop) rainwater for landscape irrigation and interior non-potable uses such as toilet flushing.

Demonstration projects/public education

- Implement LID demonstration programs at city or town hall, schools, DPW, etc.

Acronyms

BoH	Board of Health
CR	Conservation Restriction pursuant to MGL 184, S.31-33
DPW	Department of Public Works
GI	Green Infrastructure
LID	Low Impact Development
OSRD	Open Space Residential Design
PB	Planning Board
SP	Special Permit

Reference Materials

For additional information on best practices, including the Commonwealth's model OSRD bylaw, please see the following websites:

- Massachusetts Smart Growth/Smart Energy Toolkit, including case studies and model bylaws:
http://www.mass.gov/envir/smart_growth_toolkit/
- Massachusetts Smart Growth Model Open Space Design/Natural Resource Protection Zoning:
http://www.mass.gov/envir/smart_growth_toolkit/bylaws/model-osd-nrpz-zoning-final.pdf
- CMRPC's Community Development and Planning Services:
<http://www.cmrpc.org/community-development-and-planning-services>
- Shaping the Future of Your Community Program:
<http://www.massaudubon.org/shapingthefuture>

Contacts

Mass Audubon and CMRPC are available as continuing resources in the community. For questions regarding this analysis or how to implement recommended changes, please feel free to contact us. Additionally, CMRPC may be available for additional Community Development and Planning Services as stated above.

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