

Attachment “A”

Recommended Modifications to Town of Littleton Subdivision of Land Regulations relative to Stormwater Management and Roadway Construction

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§ 249-6. Terms defined.

1. Suggest replacing first line with “The definitions of the Subdivision Control Law are incorporated herein (MGL, Ch. 41, S. 81L).”
2. Revise “SUBDIVISION” definition so that it is not within the STREETS heading.
3. Add the following definitions:
 - AASHTO Green Book -- AASHTO’s A Policy on Geometric Design of Highways and Streets, latest edition including all supplemental amendments;
 - MassDOT PD&DG -- MassDOT Project Development and Design Guide;
 - MUCTD -- Manual on Uniform Traffic Control Devices, latest edition including all supplemental amendments;
 - Roadside Design Guide -- AASHTO Roadside Design Guide, latest edition including all supplemental amendments;
 - ITE -- Institute of Transportation Engineers Traffic Engineering Handbook, latest edition including all supplemental amendments;
 - MassDOT Standard Specifications. -- MassDOT Standard Specification for Highways and Bridges, latest edition including all supplemental amendments;
 - MassDOT Construction Standard Details, latest edition including all supplemental amendments;
 - ADA -- Americans with Disabilities Act, latest edition including all supplemental amendments;
 - MAAB -- Massachusetts Architectural Access Board Rules and Regulations (521 CMR), latest edition including all supplemental amendments.
 - ARTERIAL STREET -- Arterial Streets provide the highest level of mobility at the greatest vehicular speed for the longest uninterrupted distances and are not intended to provide access to specific locations. An Arterial Street has an expected Average Daily Traffic volume of greater than 8,000 vehicle trips per day. For proposed streets and improvements to existing Arterial Streets, the projected Average Daily Traffic volume shall be based on maximum potential build-out of all lots being accessed by said street, plus projected future through traffic volumes as deemed reasonable and realistic by the Board. Proposed Arterial Streets shall be designed in accordance with Chapter 3 Basic Design Controls of the MassDOT PD&DG. *(from MassDOT and Town of Acton Subdivision Rules and Regulations)*
 - BOARD -- The Planning Board of the Town of Littleton.
 - CADD -- Computer Aided Drafting and Design. When in reference to electronic files, CADD should mean DWG files compatible with Autodesk’s AutoCAD 2007 drawing format or as otherwise required by the Board prepared in accordance with the MassGIS Level I Standard for Digital Plan Submission to Municipalities.
 - CONTRACTOR -- When referring to the MassDOT Standard Specifications, Contractor shall mean the Applicant or the Contractor performing the work on behalf of the Applicant.
 - CUL-DE-SAC -- Minor Streets or Lanes open at one end only with a special circular turning area provided at the closed end having a minimum radius as specified herein.



- DEAD-END STREETS -- Lanes or Minor Streets open at one end only without special provisions for turning around.
- EASEMENT -- A right acquired by public authority to use or control property for a utility or other designated purpose.
- EMERGENCY ACCESS WAY -- A public or private way for secondary emergency access that is not generally available for vehicular travel, with a minimum of twenty (20) foot right-of-way, a minimum ten (10) foot wide paved surface, three (3) foot shoulders, and posts or gates installed at all entrances. Emergency access ways do not provide frontage.
- ENGINEER -- when referring to MassDOT Standard Specifications, Engineer shall mean the Town of Littleton or the Town's Representative.
- LOT -- An area of land, undivided by any street, in one ownership, with definitive boundaries ascertainable from the most recently recorded deed or plan which is 1) a deed recorded in Middlesex County South District Registry of Deeds, or 2) a Certificate of Title issued by the Land Court and registered in the Land Court section of such Registry, or 3) title of record disclosed by any and all pertinent public documents.
- MAJOR TREE -- Major trees are defined as trees with breast height diameter of 8 inches in diameter or larger.
- MASSACHUSETTS (MASS) STATE PLANE -- Massachusetts State Plan Coordinate System (North American Datum of 1983), with the units being United States Survey Foot.
- MASSGIS -- Commonwealth of Massachusetts' Office of Geographic Information.
- MUNICIPAL SERVICES -- Public utilities furnished by the Town of Littleton in which a subdivision is located, such as water mains, stormwater drains, sanitary sewers, gas pipes, electrical lines, telephone lines, TV cables and fire alarm systems.
- NAVD 88 -- North American Vertical Datum of 1988.
- OSHA -- Occupational Safety and Health Administration
- PARTIES IN INTEREST --
 - The person submitting a Preliminary or Definitive Subdivision Plan of Land to the Board, and the owner(s) of the land shown on the subdivision plan.
 - Direct abutters to said land; abutters to the direct abutters within 300 feet of the boundary line of the subdivision; owners of land located directly opposite on any public or private street or way from the land shown on the subdivision plan; all as they appear on the most recent applicable assessor's tax list, including any such abutters or owners whose affected land is located in another city or town.
 - The Board and the Planning Boards of every abutting city or town.
- PRELIMINARY PLAN -- a plan of a proposed subdivision or resubdivision of land drawn on tracing paper, or a print thereof, showing (a) the subdivision name, boundaries, north point, date, scale, legend and title "Preliminary Plan"; (b) the names of the record owner and the applicant and the name of the designer, engineer or surveyor; (c) the names of all abutters, as determined from the most



- recent local tax list; (d) the existing and proposed lines of streets, ways, easements and any public areas within the subdivision in a general manner; (e) the proposed system of drainage, including adjacent existing natural waterways, in a general manner; (f) the approximate boundary lines of proposed lots, with approximate areas and dimensions; (g) the names, approximate location and widths of adjacent streets; (h) and the topography of the land in a general manner.
- PROFESSIONAL ENGINEER -- An engineer registered in good standing as a Professional Engineer with the Massachusetts Board of Registration of Professional Engineers and Professional Land Surveyors.
 - PROWAG -- Latest Proposed Right-of-Way Accessibility Guidelines whether in Draft of Adopted form as published by the United States Access Board
 - RULES -- Chapter 249, Code of The Town of Littleton, Massachusetts Subdivision of Land Regulations as set forth herein.
 - PROFESSIONAL LAND SURVEYOR -- A land surveyor registered in good standing as a Professional Land Surveyor with the Massachusetts Board of Registration of Professional Engineers and Professional Land Surveyors.
 - REGISTERED MAIL -- registered or certified mail.
 - THROUGH STREET -- A street having, by itself or by means of other streets, a connection at both ends to the overall road system of the Town of Littleton or of neighboring towns, so that each location on such street can be accessed through at least two alternative streets or combination of streets.
 - WAY, PATH -- A general term denoting a public or private way for purposes of public non-vehicular travel, including the entire area within the right-of-way. Such ways or paths do not provide frontage.
4. For Collector Street, suggest replacing current definition with “A street intercepting several Minor Streets or Lanes and which may carry traffic from such Minor Streets or Lanes to an Arterial Street or community facility, including the principal access/circulation streets of a residential subdivision. A Collector Street is also any streets of a business or industrial subdivision. A Collector Street is expected to have design speeds of 25 mph to 35 mph and have an Average Daily Traffic volume of greater than 1,000 and up to and including 8,000 vehicle trips per day. For proposed streets, the projected Average Daily Traffic volume shall be based on maximum potential build-out of all lots being accessed by said street, plus projected future through traffic volumes as deemed reasonable and realistic by the Board.”
 5. For Minor Street, suggest replacing current definition with “A subcategory of a Local Road as defined by the MassDOT PD&DG which is used to provide access to Lanes and abutting residential lots and which is not intended for use by through traffic. A Minor Street is expected to have design speeds of 30 mph or less and have an Average Daily Traffic volume of greater than 500 and up to and including 2,000 vehicle trips per day. For proposed streets, the projected Average Daily Traffic volume shall be based on maximum potential build-out of all lots being accessed by said street, plus projected future volumes of all connected Lanes as deemed reasonable and realistic by the Board.”
 6. For Lane, suggest replacing current definition with “A subcategory of a Local Road as defined by the MassDOT PD&DG which is used to provide access to ten (10) or fewer residential units and which is not intended for use by through traffic. A Lane is expected to have design speeds of 25 mph or less and an Average Daily Traffic volume of 500 or



fewer vehicle trips per day. For proposed streets, the proposed Average Daily Traffic volume shall be based on maximum potential build-out of all lots being accessed by said street.”

§ 249-10. General provisions.

1. Suggest to add new § 249-10.C: Adding the following text which will enable the data to be used for multiple GIS related purposes within the Town such as water system modeling, tax assessor’s maps and roadway inventories: “All filings for any action under these regulations must be accompanied by both paper copies and electronic copies. Electronic copies must be in two forms: Adobe Acrobat PDF Format and AutoCAD DWG Format and shall be prepared in accordance with the current version of the “MassGIS Standard for Digital Plan Submission to Municipalities” meeting the requirements for Level I submission standards and be in AutoCAD DWG format version 2007 or later. Electronic copies must be submitted on a CD-ROM and must be accompanied by the completed checklist required in the MassGIS standard. The MassGIS standards and checklist can be obtained from <http://www.mass.gov/mgis/standards.htm>.”

§ 249-32. Definitive Plan.

1. In § 249-32.A.1.a: Add the following to the end: “List of Minimum Drawings Required
 - i. Title Sheet: with Project Locust, Index of Sheets, Development Name, Development Address, Applicant Name, and Contacts;
 - ii. Existing Conditions Plan: showing entire site to be subdivided, with existing lot lines, rights-of-way, easements, stonewalls, major trees, tree lines, contours at no more than 2’ between minor contours and 10’ between major contours. Preferred 1’ between minor contours and 5’ between major contours when this will not affect plan readability;
 - iii. Plan of Lots or Lotting Plan: showing lots lines, sizes, bearings and distances, etc.;
 - iv. Easement Plan: if required for clarity;
 - v. Site Plan;
 - vi. Roadway Profile;
 - vii. Typical Sections;
 - viii. Construction Details;
 - ix. Roadway Cross sections.”
2. In § 249-32.A.3: Suggest specifying a version of standard AutoCAD and a standard file type such as AutoCAD 2007 format to meet required standards specified under In § 249-10.
3. In § 249-32.C.3: Revise to clarify that a Professional Engineer shall stamp the sheets showing proposed roadway, drainage etc. and that a Professional Land Surveyor shall stamp the lotting plans.
4. In § 249-32.C.10: Suggest requiring all plans be tied to Massachusetts State Plane Coordinate System and NAVD 88.
5. In § 249-32.C.11: Require stationing every 100 ft and tick marks every 50 feet. Include Point of Curvature and Tangency stations, curve data, alignment tie information and



- station equations, if applicable. Suggest requiring all alignment information be shown on all Lotting Plans and Site Plans.
6. In § 249-32.C.13: Add the following to the end: “Granite bounds shall be set at all lot and easement corners along the right-of-way. Semi-permanent monuments shall be set at all other lot and easement corners within the subdivision.”
 7. In § 249-32.C.14: Replace text with: “Location of existing and proposed watercourses, wetlands, perennial and intermittent streams, certified vernal pools, potential vernal pools (as identified on maps prepared by MassGIS), certified and potential vernal pool upland habitat areas, rare and endangered species, waterways and water bodies on and within 100 feet of the proposed subdivision, including any buffer zones and riverfront areas as defined by the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, Sec. 40) and Littleton Wetland Bylaw;” (*from Commentary on Updating Subdivision Regulations in Massachusetts*)
 8. Add a new § 249-32.C.17: “Major site features, such as existing stone walls, fences, buildings, rock ridges and ledge, swamps, flood plains as identified on the Federal Insurance Rate Maps and other flood plains identified by a Professional Engineer and historic features on and within 100 feet of the proposed subdivision. The plan shall identify which of the above shall remain undisturbed.” (*from Commentary on Updating Subdivision Regulations in Massachusetts*)
 9. In § 249-32.D: Change “Street plans and profiles” to read “Site Plans and Profiles”
 10. In § 249-32.D: Suggest requiring plans at 1”=20’ and profiles at 1”=4’ (Vertical) which is preferred or plans at 1”=40’ and profiles at 1”=8’ (Vertical).
 11. In § 249-32.D.2: Require plans be developed per the MassDOT Project Development & Design Guide. Chapter 18 dictates the formatting of plans and profiles including the look of the baselines and profiles.
 12. In § 249-32.D.2: Replace “United States Geologic Survey” with “NAVD 88”.
 13. In § 249-32.D.2: Replace “Wherever the finished pavement side line differs from the original side line by two (2) feet or more...left side line shall be shown as a short dash-dot-dash line” with “Cross sections cut at 50-foot or closer station intervals and at all critical locations shall be provided with the Site Plans. Cross sections shall be prepared at fifty (50) foot intervals, showing the existing ground and proposed finished ground and shall depict prominent features in section. They shall be shown at a scale of 1” = 4’ and if approved by the Board in no case shall be smaller than 1”=8’. The right-of-way lines shall be shown in the cross sections. Additional cross sections may be required at critical sections, in the opinion of the Board.”
 14. In § 249-32.D.5: Include stormwater mitigation practices.
 15. In § 249-32.E: Suggest inserting “Development Impact Statements. The following shall accompany submission of a Definitive plan:” as the new heading.
 16. Suggest moving § 249-32.E “Environmental Analysis” paragraph to be new § 249-32.E.1. Adjust §§ 249-32.E.1 to § 249-32.E.2.e down one paragraph level.
 17. Suggest adding the following as new § 249-32.E.2:
 - 2) Traffic Study: Traffic Analysis and Mitigation. The applicant shall submit a traffic analysis and mitigation plan, as described below. Use “Trip Generation Standards” by Institute of Transportation Engineers for trip estimates. Explain traffic impacts,



types of streets, opportunity for public transit access, impacts on vehicle, pedestrian, and bicycle circulation. Include:

- a) Estimated daily and peak hour vehicle trips generated by the proposed use, traffic patterns for vehicles and pedestrians showing adequate access to and from the site, and adequate vehicular and pedestrian circulation within the site. Data used may not be more than two years old.
 - b) Traffic flow patterns at the site including entrances and egresses and curb cuts on site and within two hundred (200) feet of the site.
 - c) A plan to minimize traffic safety impacts of the proposed project through road physical design and layout, promoting use of bicycle lanes or car-pooling, the creation of passive recreation within the project, or other appropriate means. This plan shall evaluate alternative mitigation methods to reduce traffic by 15% from a project with no mitigation, including transit, car-pool, and bicycle paths, provision of on-site passive recreation, and integrated land uses such as on-site services, retail, and housing.
 - d) A detailed assessment of the traffic safety impacts of the proposed project on adjacent roads, including the number or average daily vehicle trips (ADT), peak-hour traffic levels, road capacities, and impacts on area intersections and traffic safety.
 - e) Such analysis shall also include a plan, as necessary, to mitigate such impacts including construction of improvements, payment in-lieu-of the project's proportional share of such improvements, or other "soft" solutions.
 - f) An overall network analysis showing how the project distributes traffic and enhances the flow of the existing network.
 - g) An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.
 - h) Adequate pedestrian access to provide access within a project and to adjacent properties.
 - i) Safe provision for school bus stops and, if appropriate, public transit stops.
 - j) Documentation that the project, including any concurrent road improvements, will not decrease the level of service (LOS) of all roads and intersections affected by the project below the lesser of existing conditions or LOS B. If requested, the Planning Board may accept in-lieu-of payments to fund a project's proportional share of necessary improvements to mitigate off-site traffic impacts or to otherwise reduce traffic. The Board may exempt residential projects that would have equal traffic impacts if they were developed as an as-of-right development without Site Plan Approval and Subdivision Approval.
18. In § 249-32.E.1.b: Replace "important wildlife habitats" with "priority and estimated habitat for rare and endangered species".
19. In § 249-32.F.1: Add "Refer to the Town of Littleton Typical Sections included in the appendices which are provided for information only. Official copies shall be obtained at the Planning Department Office. "
20. Add a new § 249-32.F.4: An erosion and sedimentation control plan designed to ensure, mitigate and prevent erosion/sedimentation of disturbed areas during and after construction activities. The plan shall show, in detail, what and when such measures will



be implemented, on both a temporary and permanent basis, including land disturbances for house construction.

21. Suggest adding a new § 249-32.F.5: A separate plan showing where a storm drainage line, or any type of drainage structure discharges within 200 feet of a brook, stream, or drainage area.
22. In § 249-32.G.1: Suggest requiring that a copy be sent to the Highway Department.
23. In § 249-32.G.4.a: Add “by a Town approved inspector or an authorized agent of the Town. Suggest adding a line to require a Certificate of Conformity prepared and signed by a professional engineer as to conformance to the design standards, under Article IV of this chapter.
24. In § 249-32.G.5: Suggest requiring certification that the required approvals (if any are needed) by the Conservation Commission and/or the Zoning Board of Appeals have been obtained prior to approval by the Planning Board.
25. In § 249-32.G.5.C: Suggest requiring electronic files of the submittal materials in Adobe Acrobat PDF format.
26. In § 249-32.G.5.C: Suggest requiring electronic and hard copies as-built plans accompanied by a certification by a professional engineer as meeting the requirements of the design and construction standards of the regulations for complete release and acceptance.

ARTICLE IV, DESIGN STANDARDS

§ 249-39. General Provisions.

1. In § 243-39: Add the following references MassDOT Specifications, Supplemental Specifications, MUTCD (Current Edition), AASHTO (Current Edition), American Disabilities Act (ADA), Massachusetts Architectural Access Board (MAAB) and Public Rights-of-Way Accessibility Guidelines (PROWAG).
2. In § 243-39: Add “Streets, sidewalks, water systems, sanitary sewers, storm drain systems, public and private utilities and other infrastructure shall be designed and constructed in accordance with these subdivision regulations, MassDOT PD&DG, MassDOT Standard Specifications, MassDOT Construction Standard Details, MUTCD, AASHTO Green Book, AASHTO Roadside Design Guide, MUTCD, ADA, MAAB and PROWAG including but not limited to material specifications, workmanship, care of work, testing and certifications.” All materials proposed shall meet the minimum material specifications of the Standard Specifications and shall be listed on the “QUALIFIED CONSTRUCTION MATERIALS LIST” of products acceptable for use on MassDOT Highway Division construction contracts which can be downloaded from the MassDOT Highway Division website unless the Applicant submits a waiver request for an alternate material for approval by the Board and Town of Littleton Highway Department.

§ 249-43. Streets and Paths.

1. Suggest reorganizing § 249-43 Streets and Paths by adding the following subsections and organizing the current items into the appropriate subsection:
 - a. 1) Basic Design Controls,

- b. 2) Horizontal and Vertical Alignments,
 - c. 3) Cross section and Roadside Elements,
 - d. 4) Access Control and Intersections,
 - e. 6) Landscaping and Aesthetics,
 - f. 7) Construction Traffic Management
2. In § 249-43.A: Revise text to read “Street cross sections shall be designed in accordance with the minimum design requirements of the Typical Sections provided in the appendices for the respective street classification, See Figures 1 to 4 in the appendices. Additional considerations shall be made to site specific uses and conditions as well as Chapter 5 “Cross Sections and Roadside Elements of the MassDOT PD&DG, AASHTO Roadside Design Guide and AASHTO Green Book.
 3. In § 249-43.B and D: Include requirements that all pedestrian accessible routes meet the current ADA, MAAB and PROWAG standards for handicap accessibility including but not limited to requirements for Detectable Warning Panels, cross slopes, running slopes etc.. Reference the relevant MassDOT Standard Construction Details and Standard Specifications.
 4. In § 249-43.B: Add design requirements for traffic signals and include under the proposed subsection 4 if they are deemed to be required as part of a project. Some suggestions would be requiring pre-emption, specific types of equipment if desired etc... in addition to the minimum design requirements set forth in the MUTCD, ITE and MassDOT Standard Specifications and approved construction materials.
 5. In § 249-43.B.6: Revise to specify that the horizontal alignment be designed in accordance with Section 4.2 of the MassDOT PD&DG and to require minimum centerline alignment radii based on design speed using MassDOT PD&DG for non-superelevated roadways in Exhibit 4-9 which will be included as reference. If roads are proposed to be superelevated and a written waiver is granted by the Board allowing superelevation than the horizontal alignment shall be designed in accordance with the AASHTO Green Book using an allowable eMax of 6.0%. Roadway superelevation shall only be allowed by the Board in special circumstances when the use of non-superelevated curves is not feasible.
 6. In § 249-43.B.10: Revise to read “Street intersections on all Collector and Arterial Streets, including...”. Refer to the MassDOT Road Inventory for the most current classification of roadways within the Town of Littleton. Website: <http://www.eot.state.ma.us/default.asp?pgid=planning/interactiveMaps&sid=about>
 7. Add a new § 249-43.B.12: “The nearest line of any driveway shall not be closer than fifty (50) feet from the intersection of any two (2) streets.”
 8. Suggest adding a new § 249-43.B.13: “All subdivisions with 10 or more lots located in an area where school busing is provided or is likely to be provided in the future must provide at least one bituminous or cement concrete paved bus waiting area for school children located at the entrances to the subdivision or in the area where the schools determine buses will stop to pick up children who live in the subdivision.”
 9. In § 249-43.D.2: Suggest moving this to the subsection 4 and requiring the design to be in accordance with Chapter 6 of the MassDOT PD&DG. Include Exhibit 6-13 as reference which addresses profile grades of intersecting streets.



10. In § 249-43.D.3: Revise to “Vertical curves are required when there is a profile grade change of more than 1.0% between two adjacent tangents. Vertical curves shall be determined considering the existing topography, safety, and the abutting properties. The evaluation should establish the critical abutting locations such as buildings, driveways, existing roadways and steps. Horizontal and vertical curves shall be designed concurrently to obtain safety, uniform speed, pleasing appearance and efficient traffic operations. Vertical curves shall be designed in accordance with Section 4.3.3 Vertical Curves and 4.4 Combination of Horizontal and Vertical Alignments of the MassDOT PD&DG and with the AASHTO Green Book.” Include summary tables of design controls for crest and sag vertical curves.
11. In § 249-43.E.1: Add the following to the end: “All intersections shall be designed with the minimum sight distances required by the AASHTO Green Book “Intersection Sight Distance” section.
12. In § 249-43.E.2: Add the following to the end: “All horizontal curves shall be designed to accommodate the minimum sight distances required by the AASHTO Green Book “Sight Distance on Horizontal Curves” section. “
13. In § 249-43.F Current requirements result in a rather large circular cul-de-sac. Suggest considering adding reference to AASHTO Exhibit 5-8D for minimum design requirements for cul-de-sacs and specifying that only circular offset type are allowed to address Eric Durling’s memo. AASHTO only requires a diameter of roughly 100-feet to accommodate a 30-foot wheel base. Suggest considering reducing property line radius accordingly. Additional guidance is also provided in the “Commentary on Updating Subdivision Regulations “. Additional input is required from the Town regarding what is desired in a center island. Current wheel base requirements of 30-feet are comparable to an AASHTO SU (Single Unit Truck) Design Vehicle. Suggest Town consider requiring sufficient accommodations specifically for current Town of Littleton Fire Department or Highway Department requirements which may or may not exceed 30-foot wheel base.
14. In § 249-43.F: Suggest requiring granite edging on the inside an outside curb lines to allow for the occasional larger design vehicle. The edging should be MassDOT Type SA.
15. In § 249-43.F: Verify landscaping requirements and revise to minimize maintenance per Jim Clyde’s comments. Guidance from “Commentary on Updating Subdivision Regulations” suggests making the maintenance of the inner island the responsibility of the developer, its’ successors and assigns or a homeowners association.
16. In § 249-43.F: Suggest defining what the Board considers unusual circumstances. For example, topography, resource areas, existing or proposed buildings etc... Suggest also specific a “T” style hammerhead designed in accordance with the AASHTO Green Book as the only other approved option under this unusual circumstance as approved by the Board. Suggest specifying the actual Town of Littleton Fire Department or Highway Department wheel base requirements (if it exceeds 30-feet) for this hammerhead.
17. Suggest including language to allow the use of no curbing for rural roadways when approved by the Board to maintain a rural character or on scenic roads. In these cases drainage swales or other Low Impact Development Techniques shall be required as a component to meeting the Stormwater Management requirements.
18. Consider including section specific to Landscaping and tree planting to require minimum sizes, mix of species, minimum set back requirements, clear height, set back from intersections, etc... The “Commentary on Updating Subdivision Regulations in



Massachusetts” contains a few good suggestions, please also review Attachment B for additional items which did not pertain directly to roadway or stormwater.

- a. Street trees shall be clear of stems or branches to a minimum height of 6-feet.
- b. Street trees shall not be permitted within twenty-five (25) feet of the curb line of the intersection of two streets.
- c. Street tree locations shall be coordinated with all existing and proposed below grade and above grade utilities to avoid current or future conflicts and shall address tree growth and canopy sizes.
- d. The center of the tree should be four feet from pavement or curbs.

§ 249-47. Easements.

1. In § 249-47 C: Replace the paragraph with: “When in the design of a surface water drainage system, the outlet discharges water that has been collected within the confines of the subdivision in a concentrated stream onto land of others, and this land being located beyond the external boundaries of the subdivision to within reasonable proximity of the subdivision, the applicant shall be required to obtain an easement, suitable for recording, which would legally allow such surface drainage to flow onto or over such land of others. Proof of such easement shall be provided to the Board. The easement shall be obtained at the applicant’s expense.”
2. In § 249-47 D: Review and verify the type of slope easement required. Are these temporary slope easements required for construction or are they permanent slope easements required for general and emergency maintenance by the town after the roadway has been accepted.

§ 249-51. Stormwater Management.

1. We suggest reorganizing this section to address both stormwater water management and drainage calculations and drainage conveyance.
2. In § 249-51 A: Insert the following to the beginning of the paragraph: “Stormwater management shall be designed and implemented in conformance with the stormwater management guidelines as established by the latest Massachusetts Department of Environmental Protection, as amended except as noted otherwise below.”
3. Suggest adding section stating “All drainage calculations shall be performed in accordance with the MassDOT PD&DG”
4. In § 249-51 A: Delete the last sentence: “The calculated total peak runoff rate and volume at the boundaries of the site in a twenty-five year storm as defined by Soil Conservation Service TR55 shall not be increased.” The DEP guidelines provide more complete requirements that should be followed including not increasing peak runoff volumes which is not currently addressed in the subdivision regulations.
5. In § 249-51 C: Replace with “All detention or retention structures shall be designed on the basis of the 100-year frequency storm as defined by SCS TR55. Culverts shall be designed on the basis of the 50-year frequency storm as defined by SCS TR55. Storm sewers shall be designed on the basis of the 25-year frequency storm as defined by SCS TR55.”



6. Incorporate the requirements of Chapter 8 of the MassDOT PD&DG for all drainage and erosion control design except where it may be noted otherwise in these regulations.
7. In § 249-51 D: Delete “with no storm sewers of less than a twelve-inch inside diameter and”.
8. In § 249-51 D: Add “located on both sides of the roadway” after “with catch basins”.
9. In § 249-51 D: Insert “upstream” before “corners of the roadway”.
10. In § 249-51 D: Add the following to the end: “Additional manholes shall be installed at all changes in slope and alignment. Stormwater runoff in street gutters shall not be permitted to flow upon the surface for a distance longer than 300 feet before it enters the underground catch-basin-to-manhole system. In no instances shall catch basins be located along a driveway or sidewalk ramp cut. Catch basins shall not be directly connected to one another but shall rather be manifolded into a drain manhole and shall be designed so that surface water does not cross the roadway.”
11. In § 249-51 D: Suggest adding the following to the end: “Curbs and gutters may be eliminated along certain roadways, as identified by the Board, where drainage is provided in swales and/or major detention basins as desirable to recharge the groundwater aquifer.”
12. In § 249-51 F: Add the following to the end: “Peak runoff rates shall be estimated for every subcatchment, reach and detention pond provided for the 2-year, 10-year, 25-year and 100-year frequency storms. The drainage system shall be designed such that there is no increase in the peak rates of runoff from any of the watershed areas at the discharge point(s) from the site for any of the modeled storms. At drainage discharge points, provision shall be made for velocity reduction using appropriate technologies so as to prevent erosion at the point of discharge and down gradient.”
13. In § 249-51 G: Revise to read: “All drainage calculations shall be performed in accordance with Chapter 8 of the MassDOT PD&DG. Drain pipes shall have a minimum inside diameter of twelve (12) inches and shall be constructed of material approved by MassDOT for such use. In general, pipes shall be designed to flow full with the hydraulic gradient at the crown and minimum pipe velocities of 2 ft/s and maximum velocities of 9 ft/s.
14. In § 249-51 G: Replace “Drainage calculations” with “The capacity of pipes”.
15. In § 249-51 G: Replace “performed” with “determined”.
16. In § 249-51 G: Revise to require a hydraulic gradeline analysis be performed and provided to the Board for review. Analysis should include plan of the watershed drainage areas with each area labeled to include number, area, CN and Time of Concentration. Plan should also include identified discharge points, topography, existing streams, water bodies or detention basins.
17. In § 249-51 H: Suggest adding the following paragraph: “When an open drainage system is used, grass swales shall be designed to fit the natural contour of the land as much as possible. Disturbed land shall be landscaped to conform to the surrounding area and planted to eliminate the possibility of erosion and siltation. Swales shall conform to the design guidelines established by the Massachusetts Department of Environmental Protection, as amended. Swales shall be provided with easements, which shall permit access by the Town for maintenance purposes in accordance 249-51.”
18. In § 249-51 I: Add the following paragraph: “At detention basins and retention basins, the maintenance berm shall be designed in accordance with the Massachusetts



Stormwater Handbook, latest edition. The maintenance berm shall be flat and at least fifteen (15) feet in width. Detention basins and retention basins shall be designed to control the 100-year frequency storm event and shall comply with the requirements established by the Massachusetts Department of Environmental Protection, as amended. The pipe inlets discharging into the basin shall be at or above the 25-year storm event ponding elevation. Detention basins constructed by berming shall be designed and constructed as a dam. Banks shall be stabilized to prevent seepage. Detention basins shall be designed so that the maximum depth, including freeboard shall not exceed eight (8) feet. A minimum thirty (30) foot setback as measured from the top of the inside slope to all property lines shall be required.”

19. In § 249-51 J: Add the following paragraph: “In situations where development interrupts an existing drainage course, the site drainage shall be designed to accommodate the flows and volumes from off-site. In the case of interrupted streams, the site design shall incorporate provisions to reroute flow around the development and back to the existing stream bed prior to flows leaving the property.”
20. In § 249-51.K: Suggest adding “The Board may authorize the use of stormwater drainage facilities located off the development site provided that:
 - a. The peak rate of stormwater runoff from such off site facilities does not exceed the rate existing prior to the new construction based on a 10-year design storm; and
 - b. The applicant has retained the rights and powers necessary to assure that the site stormwater drainage facilities will be properly maintained in good working order.”
21. In § 249-51.L: Add the following paragraph: “Street drainage shall not be channeled into a wetland or water body without first being treated by on or more treatment Best Management Practices (BMPs).”

Suggest adding a new “§ 249-53. Erosion and Sediment Control

1. In order to reduce erosion accompanying the installation of ways, utilities and drainage systems, a sediment control plan shall be prepared and implemented. The plan shall comply with the requirements of Chapter 8 of the MassDOT PD&DG and the National Pollution Discharge Elimination System (NPDES) Construction General Permit.
2. Land shall be developed in increments of workable size which can be completed during a single construction season. Erosion and sediment control measures shall be coordinated with the sequence of grading, development and construction operations. Control measures such as hydroseeding, berms, interceptor ditches, mulching, temporary sodding, terraces, and sediment traps shall be put into effect prior to the commencement of each increment of the development/construction process.
3. Vegetative cover and runoff characteristics shall be maintained as close as possible to conditions before development by reducing cut and fill and other considerations.
4. Water resources shall be protected, including but not limited to floodplains, wetlands, aquifer recharge areas, and Town well fields.
5. Sediment basins (debris basins, desilting basins, or silt traps) shall be installed in conjunction with the initial grading operations and maintained through the development



process to remove sediment from runoff waters draining from land undergoing development.

6. A note on the Erosion Prevention and Sedimentation Control Plan shall state that the applicant is required to clean up any sand, dirt, or debris which erodes from the subdivision onto any public street or private property, and to remove silt or debris that enters any existing drainage system including catch basin sumps, pipelines, manholes and ditches.
7. Hay bales or Board approved equivalent must be used around the catch basins on the proposed streets to protect them from the eroding soils and provide a check dam to slow the runoff during construction.”

ARTICLE V, REQUIRED IMPROVEMENTS

§ 249-66. Preparation and surfacing of roadway.

1. Revise opening paragraph as follows: “Improvements listed in Article V shall be constructed in accordance with these regulations, MassDOT Standard Specifications, MassDOT Construction Details, OSHA, MUTCD, AASHTO Roadside Design Guide, AASHTO Green Book and shall be consistent with all applicable local codes and ordinances, standards of practice and shall be made by the applicant without cost to the Town.”
2. For paragraphs § 249-66 A through F suggest revising all to reference the applicable documents, design standards and typical sections. Provide guidance for key issues such as pavement, site preparation etc... with specific references to those documents. Some examples of additional items to include in this section may also include:
 - a. Construction Staking: Developers shall employ, at their own expense, a professional engineer or a professional land surveyor to set all lines and grades in a manner satisfactory to the Highway Department, Town or the Town’s representative and in accordance with the provisions of the MassDOT Standard Specifications.
 - b. All materials, workmanship, testing and construction methods used for roadway excavation and embankments shall conform to the MassDOT Standard Specifications
 - c. All driveway openings in all areas with granite curb has been used, i.e., around all cul-de-sacs, shall be completed during the subdivision construction. Granite curb corners Type A shall be used at all driveway openings.
 - d. The water and sanitary sewer systems shall be tested and approved by the department or agency having jurisdiction prior to installation of base course(s) and pavement.
 - e. All lot connections shall be installed to the right-of-way line, and marked with an iron pin or surveyed so as to be easily located in the future
3. In § 249-66 F: Suggest moving to the design standards section and revising to reference typical sections. Additional provisions for bicycle and pedestrian accommodations should be addressed and based on minimum widths guidance based on Chapter 5 of the MassDOT PD&DG.



§ 249-73. Curbs.

1. In § 249-73: Suggest revising the wording to “All curbing shall be MassDOT Granite Curb Type VA-4 or as approved by the Board and shall be installed on both sides of the street and for the total length of the street and on other streets for the full radius plus at least three(3) feet on each end of all street intersections. MassDOT Sloped Granite Edging Type SA shall be used for the inner and outer circle of cul-de-sacs and for median islands when median islands have been approved by the Board. “

§ 249-81. Sidewalks.

1. In § 249-81.A & B: Revise minimum sidewalk requirements to reflect current MassDOT, ADA and MAAB requirements. For example, require width to be a minimum of 5 feet exclusive of the curb to meet American Disabilities Act (ADA) and Massachusetts Architectural Access Board (MAAB) clear width requirements and require maximum cross slopes of 1.50% to reflect construction tolerances. Suggest including in the appendix a typical sidewalk clearance detail which depicts the typical requirements for the sidewalk clearances.
2. Refer to typical sections which depict the required section and materials. Green recommends cement concrete for all sidewalks due to lifespan, durability, aesthetics and ability to achieve and maintain ADA compliance unless a written waiver is obtained by the applicant.

§ 249-85. Utilities.

1. In § 249-85.B.1: Revise to: “Piping shall be Class III, Class IV, or Class V reinforced concrete pipe, per MassDOT PD & DG Exhibit 8-48, except in locations with less than 18” of cover. All piping with less than 18” of cover shall be ductile iron Class 52 or thicker. At these locations.” In addition, we suggest a modified table be included in the regulations, showing required pipe for various covers to proposed finished grade (Exhibit 8-48 shows covers to proposed subgrade).
2. In § 249-85.B.2: Revise to: “All Manholes shall meet MassDOT Standard Construction Detail E 202.4.0 Precast Concrete Manholes 9’ or Less in Depth. All catch basins shall meet MassDOT Standard Construction Detail E 201.4.0 Precast Concrete Catch Basin.”
3. Suggest adding new § 249-85.B.4: “Sub-drains, shall be provided when deemed necessary to control the flow of groundwater beneath the proposed roadway and shall be constructed in accordance with the Typical Details provided in the appendices. ”

§ 249-89. Other requirements.

1. Add requirements for the design and construction of retaining walls. Suggest that retaining walls be constructed in accordance with MassDOT Construction Standard E 302.2.0 when approved by the Board or designed in accordance to specific site conditions and stamped by a Professional Engineer. All exposed retaining wall finishes shall be approved by the Board.



2. In § 249-89.A.1: Suggest adding “, at the center point of cul-de-sac streets” after “curvature of streets”.
3. § 249-89.B: Revise title from “Street signs” to “Signage”.
4. In § 249-89.B: Insert the following at the end: “All applicable street, warning and regulatory signs shall be furnished and installed in accordance with the latest edition of MUTCD and as required by the Board. All signs shall be installed prior to the release of any lots.” *(from 2002 Durling memorandum)*
5. In § 249-89.B: Suggest adding the following to the end of the above comment: “Street signs shall be erected at all intersections and shall identify the names of all intersecting streets. These signs shall be of the same type now existing in the Town and shall meet the specifications of the Littleton Highway Department. Street sign posts shall be seated in concrete. Street signs at intersections shall be erected prior to the construction of the building structure on the street.”
6. In § 249-89.D(1): Add language to require that adequate site distances be provided and considered when selecting and planting trees and other landscaping. Additional language should be added to address providing adequate clearance from sidewalks, utilities, overhead wires, etc.
7. In § 249-89.G(2): Replace “registered professional land surveyor” with “professional engineer”.
8. Suggest adding § 249-89.G(3): Require certification by a professional land surveyor that all lot corners have been marked on the ground with permanent monuments as required herein.
9. Add § 249-89.G(4): If proposed streets are intended for acceptance as public ways, a boundary description and a plan suitable for recording at the registry of deeds showing the location of the street layout lines, monuments and any easements to be conveyed, or already conveyed, to the town shall be provided to the Board.
10. Suggest revising § 249-89.H to more clearly define inspection requirements, for example:
Monitoring and Inspections
The Planning Board may choose to require independent inspections of the ongoing work or require the applicant to provide written certification to the Board that the work has been completed in accordance with these regulations.

Inspections

Inspection shall be made and the project shall be certified in writing to the Planning Board by the Highway Department or their authorized designee or by a registered professional engineer chosen by the Planning Board and the developer shall pay the fee in effect for such inspection services. The applicant shall deposit funds equal to the amount of the inspection services with the Treasurer of the Town of Littleton to pay for this work, in accordance with applicable General Laws, prior to the start of the work. Municipal inspections in no way relieve the developer, contractor or project engineer of responsibility in insuring that all materials and all construction meet all standards as stated in these Rules and Regulations.

The contractor must ensure that the municipality’s inspector is provided adequate notice to ensure inspection at the following points with at least a two business day



notice. No further work shall be done on a project until each phase has been inspected and approved.

Inspection points shall include, at a minimum:

- Underground utilities and services before the backfilling of trenches or other covering of structures.
- Curbing prior to the placement of the top course of bituminous concrete surface.
- Roadway upon completion of the sub-grade gravel base course, binder and surface course prior to each required construction step.
- Sidewalk upon completion of the sub-grade gravel base course, binder and surface course prior to each required construction step.
- At the completion of all the improvements.

Written Certification

Inspection shall be made and the project shall be certified in writing to the Planning Board by a professional engineer chosen by the applicant, who shall certify that all work was done in accordance with the approved subdivision plans, except as noted, and shall provide a detailed list and plan of changes between the approved plan and what was built. An engineer or engineer's agent shall be on site during the entire construction process to ensure compliance with the design and provide written certification to the Board that the engineer or engineer's agent was on site during the entire construction process.

11. Add § 249-89.I: "Development Signage. The applicant shall erect a sign at all entrances of the subdivision containing following:
 - a. Development Name
 - b. Applicant Name
 - c. Applicant Address
 - d. Emergency Contract Information (including name and current phone number)
(from Letter from Jim Clyde, Highway Operations Manager)

§ 249-96. Schedule of work.

1. Revise the language in this section to reference the construction and workmanship requirements of the MassDOT Standard Specifications.

Addition of Construction Phase/Construction Inspection Section

1. Add a new Construction Phase/Construction Inspection section to the Subdivision Regulations. The section should address the following:
 - a) Snow and Ice Removal - Require the applicant be responsible for snow removal in a timely manner up to the time the Town accepts the road as a public way. We suggest defining "timely manner" as 24 hours after the start of a snow and/or ice event. *(from Letter from Jim Clyde, Highway Operations Manager)*
 - b) Safe Travelway During Construction – Require the applicant be responsible for maintaining a safe roadway during both roadway construction and lot build-out.



- Applicant should provide Traffic Management Plans be developed when work will impact existing roadways or roadways open to traffic. All work performed on the new roadway and at the intersections of new and existing roadways shall be done in accordance with MUTCD. *(from Letter from Jim Clyde, Highway Operations Manager)*
- c) Street Trees – When trees and other plantings are proposed by the applicant or as required by the Board, it shall be required that the applicant complete planting before the lots are developed. If left to the end of the lot build-out, irrigation or other other items may be in place, impacting the final location of the trees. *(from Letter from Jim Clyde, Highway Operations Manager)*
 - d) Tracked Vehicles – Tracked vehicles shall not be allowed on paved surfaces at any time during construction. Damaged pavement shall be replaced before the Town accepts the roadway.
 - e) Placement of Pavement - Under no circumstances shall pavement be placed between November 15th and April 15th, unless approved by the Town of Littleton Highway Department. All surface and binder courses shall be placed in accordance with MassDOT Specification Section 460. All base courses shall be placed in accordance with MassDOT Specification Section 420. For all pavement courses, the bituminous concrete material temperature shall be as specified in the table in Section 460.61. The present surface, including but not limited to the sub-base and all pavement courses, shall be dry before any pavement course or tack coat is applied.
 - f) Moratorium on Excavation – No excavation, trenching or other significant construction activities related to excavation or paving shall be allowed within the proposed right-of-way as indicated in the Town’s Street Opening Permit during the following times:
 - a. November 15th to April 15th
 - b. Period of inclement weather, including but not limited to rain, snow and ice.
 - c. When the temperature is below 40° Fahrenheit.
 - d. As directed by the Highway Operations Manager

Any violations of this requirement shall result in the contractor being required to fully bond all work in the roadway until street acceptance and for a period of no less than five years after acceptance in a maintenance agreement with the town. The bonding period shall be determined by the Board.

Create new Figures 1 through 3

1. See Draft Figures 1 and 2 for suggested typical Sections. We suggest additional modifications to include the following:
 - a. Locations of proposed utilities.
 - b. 5-foot wide sidewalk on one side of the roadway.
 - c. 5-foot wide grass strip between the curb and sidewalk.
 - d. Revise HMA Berm Type A Modified to be Vertical Granite Curb.
2. Split Figure 1 into two separate Figures
3. Modify Figure 2 to include the following:
 - a. Locations of proposed utilities

- b. 5-foot wide grass strip between the curb and sidewalk.
- 4. Typical Street Cross Sections: Revise pavement widths to comply with § 249-66.F.1.
- 5. Revise curb types to match the requirements of § 249-73.

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