



100 GROVE ST | WORCESTER, MA 01605

April 29, 2016

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**Subject: Proposed Site Development, Theroux Dental Complex  
103 Worcester Street  
Site Plan and Conservation Commission Review**

Dear Joe:

We received the following documents on April 8, 2016:

- Correspondence from Land Planning, Inc. to Grafton Planning Board dated April 7, 2016 re: submission of revised site plans.
- Correspondence from Land Planning, Inc. to Grafton Conservation Commission dated April 7, 2016 re: submission of revised site plans and stormwater management report.
- Plans entitled Site Development Plan; Theroux Dental Complex; Worcester St., Harris St. & Bernard Rd.; Grafton, MA dated January 26, 2016 and last revised April 7, 2016, prepared by Land Planning, Inc. (8 sheets)
- Bound document entitled Stormwater Report, Theroux Dental Complex, 103 Worcester Street, Grafton, Massachusetts dated April 4, 2016, prepared by Land Planning, Inc. for Marc Theroux.

Graves Engineering, Inc. (GEI) has been requested to review and comment on the plans' conformance with applicable "Grafton Zoning By-Law" amended through October 19, 2015; Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Handbook and standard engineering practices on behalf of the Planning Board. GEI has also been requested to review and comment on the documents' conformance with applicable Conservation Commission "Regulations Governing Stormwater Management" dated May 2013 and applicable "1988 Rules and Regulations for the Administration of the Town of Grafton Local Wetlands By-Law" amended July 2005 on behalf of the Conservation Commission. As part of this review GEI witnessed soil testing on January 6, 2016 and performed a reconnaissance site visit on April 11, 2016.

**Our comments follow:**

**Zoning By-Law**

1. The applicant's name and address are required on the plans. (§1.3.3.3.d(1) & §1.3.3.3.d(9))

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2. Two lighting fixture details were provided on Sheet 7. However, the lighting fixture locations were not show on the plan-view sheets and a photometric plan was not provided. (§1.3.3.3.d(22))
3. The water and sewer service connections were shown, however neither of these utilities was connected to the building nor do the plans show pertinent information (e.g. pipe materials and diameters, existing and proposed sewer main and sewer service elevations). Also, the water service connection is in conflict with the subsurface infiltration system. (§1.3.3.3.d.28)
4. The two entrance driveways are proposed to be only twenty feet wide for two-way traffic. Entrance widths of 24 feet are required and are customary. (§4.2.4.1.1)
5. Only eight two-inch caliper trees are proposed adjacent to the parking area; ten trees are required. (§4.2.4.5)

#### **Grafton's Regulations Governing Stormwater Management**

6. The hydrology calculations for the ten-year and one hundred-year storm events need to be rerun with NRCC Cornell data for 24-hour (not one day) duration storm events. (§6.B.3.b)
7. The plans' topography was presented with two-foot contour intervals instead on one-foot intervals. With the use of spot elevations, we were able to follow the proposed grading. Nonetheless, we defer to the Conservation Commission whether the use of two-foot contour intervals is acceptable for this project or if one-foot contour intervals must be provided. (§7.B.1.h)
8. A limit of work line was not provided on the plans. (§7.B.2.b)
9. An equipment and material storage area was not shown on the plans. There's only a general note to stockpile material outside of the riverfront area. (§7.B.2.f)

#### **Regulations for the Administration of the Wetlands By-Law**

10. GEI has no issues relative to the stormwater management system's compliance with these regulations.

#### **Hydrology, Hydraulic and MassDEP Stormwater Management**

11. Pipe sizing calculations (e.g. TR-55 or Rational Method calculations) were not submitted.
12. GEI reviewed the hydrology computations and found them to be in order except as noted in the following two comments.
13. We concur with the methodology used to estimate runoff to the kettle hole but disagree about the amount of off-site tributary area. The design engineer estimated that the tributary area extended southerly along Bernard Road to Clark Road and included some tributary area on house lots adjacent to Bernard Road and Clark Road. The total area (both off-site and on-site tributary area) to the kettle hole was modeled as 47,914 square feet (1.1 acres).

Based upon visual observations during my reconnaissance site visit and upon topography present on Grafton's GIS Map, the off-site tributary area appears to be approximately 2.4 acres (in addition to the on-site tributary area). The curb along the west side of Bernard Road captures runoff and directs it to the kettle hole; this is not evident on Grafton's GIS Map but can be observed at the site. The off-site tributary area appears to extend southerly along Bernard Road to a high point located on #11 Bernard Road near the property line of #15 Bernard Road and extends easterly to include most of Clark Road, a portion of Stowell Road and a portion of 97 Worcester Street. The tributary area to the kettle hole needs to be re-evaluated and re-remodeled accordingly.

14. In the post-development hydrology computations, the modeling of the subsurface infiltration system is not consistent with the plans. The computations modeled an overall system size of approximately 40 feet by 60 feet with 64 chambers but the plans show a system that is only 27.5 feet wide with enough room for five rows of chambers instead of eight rows. Also, the chambers were drawn at about 38 inches on center instead of 58 inches on center as presented on the "Infiltration Systems – Cross Section" construction detail on Sheet 8. The plans and hydrology computations need to be consistent.
15. Compliance with MassDEP Stormwater Handbook is reasonable except as noted in the following three comments.
16. A Stormceptor Model STC 900 proprietary stormwater treatment unit is proposed. The concept is reasonable, but supporting documents need to be submitted to demonstrate that the unit was adequately sized and that the required water quality volume will be treated. MassDEP requires calculations to convert required water quality volume to a discharge rate for sizing flow-based proprietary treatment units.
17. Sediment barrier was provided along Worcester Street at the northeast section of the site. Sediment barriers are also necessary along the remainder of Worcester Street (135+/- feet) and along Harris Street (60+/- feet and 70+/- feet) downgradient of the work areas.
18. A stabilized construction entrance needs to be shown on Sheet 5 and a construction detail needs to be provided.
19. Soil testing was performed at the site and showed the soils to be conducive to stormwater recharge. Due to plan revisions, the proposed subsurface infiltration system is no longer proposed at the testing locations. Confirmatory soil testing will need to be done. Considering the availability of data for soil testing already performed and the favorable soil and groundwater conditions, the Planning Board (and/or Conservation Commission) may wish to address confirmatory soil testing as a condition of approval.

### **General Engineering**

20. The proposed earth cut near the intersection of Harris Street and Worcester Street is a benefit to drivers exiting Harris Street in that sight distance to the north will be significantly improved.
21. At the western parking area, there needs to be a vehicle maneuvering area at the dumpster location to allow vehicles leaving the two northern-most parking spaces to maneuver without conflicting with the fence at the dumpster.

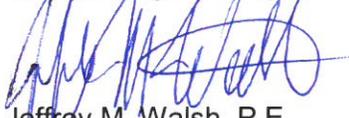
22. At catch basin CB-1, the pipe invert is only 2.0 feet below the rim. There isn't enough room to accommodate the pipe diameter, pipe wall thickness, basin flat top (typically eight inches thick), brick and the catch basin frame.
23. Catch basin CB-2 should be moved farther onto the site so that it is located completely outside the Harris Street roadway.
24. On Sheet 8, the "Precast Concrete Drain Manhole" construction detail should have ladder rungs.

**General Comments**

25. General Note 2 on Sheet 3 contradicts notes on the left side of Sheets 2 – 5. Lower elevations of the site are located within the 100-year flood plain.
26. On Sheet 6, the tree and shrub quantities in the Landscape Legend are inconsistent with the numbers of trees and shrubs shown in plan-view.
27. The scale bar (1"=100') on Sheet 1 is incorrect.
28. There are notes on Sheet 3 that appear to be associated with a former version of the plan and need to be deleted or revised as appropriate: "one-way enter sign," dimensions in the parking area of "16.0" and "35.8" and the leader note for replacing four inches of loam and seed at the existing concrete slab.
29. In the "Schedule of Drainage Structures" on Sheet 4, the "Description of Structure" for FE-1 and FE-2 are transposed.

We trust this letter addresses your review requirements. Feel free to contact this office if you have any questions or comments.

Very truly yours,  
**Graves Engineering, Inc.**



Jeffrey M. Walsh, P.E.  
Vice President

cc: Grafton Conservation Commission  
Norman Hill, P.E., P.L.S.; Land Planning, Inc.